

## INDONESIAN AQUACULTURE JOURNAL

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UDC 639.3.032

Huria Marnis, Evi Tahapari, and Jadmiko Darmawan (Research Institute for Fish Breeding)

Genetic performance of the striped catfish (*Pangasianodon hypophthalmus* Sauvage, 1878) population derived from selective breeding

Indonesian Aquaculture Journal, 14 (1), 2019, 1-5

Selective breeding to improve growth trait in striped catfish (*Pangasianodon hypophthalmus*) need genetic performance data. This study was carried out to evaluate genetic performance of different generations of the striped catfish population derived from selective breeding. Fifty fish of each population from four generations selected striped catfish was analyzed using five microsatellite loci (Pg-1, Pg-2, Pg-3, Pg-13, and Pg-14). Microsatellite allele data were analyzed using Microsoft Excel, Arlequin, and  $F_{stat}$  software. A neighborhood joining dendrogram was constructed based on Nei's distance ( $D_a$ ) matrix with 1,000 bootstrap replications using MEGA7 software. The result showed that totally 31.5 exist, ranged from 4-7. Number of allele was ranged from 5.0 to 5.2, and polymorphic data was from 0.45-0.60. There were some exception, such as the allele of the loci Pg-2—194 bp, Pg-13—227 bp, Pg-13—229 bp, and Pg-14—279 bp; their gene frequencies were increased by generation. Further analyses indicated that most genetic variations arise from individuals within populations (approximately 57.10%). The founder generation closely related to G-0 generation. Likewise, G-1 generation closely related to G-2 generation. This result indicated that selection activity had a very significant impact on the genetic improvement of the selected population.

KEYWORDS: genetic structure; microsatellite; selective breeding; *Pangasianodon hypophthalmus*

UDC 639.31

Gusti Ngurah Permana, Bedjo Slamet, Bagus Arya Permana, Ayu Krisna Dewi, and Gusti Ngurah Mahardika (Institute for Freshwater Aquaculture Research and Fisheries Extension)

Population genetic structure of spiny lobsters, *Panulirus homarus* and *Panulirus ornatus*, in the Indian Ocean, coral triangle, and South China Sea

Indonesian Aquaculture Journal, 14 (1), 2019, 7-14

Populations of spiny lobsters worldwide are threatened by overfishing, while its supply from aquaculture is currently insufficient to meet the market demand. This current study investigated the genetic structure of two economically important spiny lobsters, *P. homarus* and *P. ornatus* sourced from the Indian Ocean and South China Sea. Fragments of the cytochrome oxidase subunit-I (COI) gene of the mitochondrial DNA of 71 *P. homarus* and 42 *P. ornatus* collected from 6 and 5 fish landing sites in Indonesia, respectively, were sequenced. Homologous sequences from the Indian Ocean and South China Sea available at GenBank were included in the analysis. No genetic differences were observed in *P. ornatus* populations from the two geographic regions ( $x_{ST} = -0.005$ ) while a diminutive difference was found in the populations of *P. homarus* ( $x_{ST} = -0.002$  and 0.009). These results, combined with a negative Tajima's D estimates, points to a deficit of nucleotide variation relative to the expectations from the mutation/drift equilibrium. Reconstruction of the phylogeny of *P. homarus* demonstrates that all Indonesian samples of *P. homarus* are grouped in one cluster and share the common cluster with GenBank data originated from Taiwan, Vietnam, India, Sri Lanka, Oman, and Iran. The phylogeny of *P. ornatus* indicates that there are two separated lineages existing in Indonesia.

KEYWORDS: lobster; *Panulirus*; mitochondrial DNA; COI; nucleotide sequence; phylogeography

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Indra Pratama and Hatim Albasri (Faculty of Marine Sciences and Fisheries, Hasanuddin University)

Study on survivability of newly hatched larvae of two species of peppermint shrimp fed with different combinations and densities of live foods

Indonesian Aquaculture Journal, 14 (1), 2019, 15-22

This study was aimed to evaluate different types and combinations of live foods in relation to the survivability of newly hatched *Lysmata vittata* and *Lysmata intermedia* larvae. The experiment consisted of three trials (different species, combinations, and densities of live foods) arranged in a completely randomized design. The first and second trials were subjected to *L. vittata* with three treatments for each trial (1A, 1B, 1C for trial-1; 1D, 1E, 1F for trial-2). The third trial consisted of two treatments (2A and 2B) tested on *L. intermedia*. Each treatment had three replicates. The results showed that the survival rates were low in all treatments. However, each treatment showed a significant effect ( $P < 0.05$ ) on the average survival rate of *L. vittata* and *L. intermedia* larvae. In the first trial, treatment 1C was the only one that had survived larvae after day 35 with 4.44% of final average survival rate (FASR). Four of the larvae reached the post-larval stage. In the second trial, treatment 1F showed a better condition than the other treatments with 5.56% FASR. Nevertheless, no larvae in the second trial had transformed to post-larval stage before the experiment ended at day 46. In the third trial, no larvae survived to reach the post-larval stage. In spite of this, treatment 2B had better daily average survival rate (DASR) than treatment 2A. This research concludes that the use of copepods as live food at an early larval stage and *Artemia* at a later stage is relatively more effective to improve the survival rate of peppermint shrimp larvae.

KEYWORDS: larvae; live foods; *Lysmata vittata*; *Lysmata intermedia*; survivability

UDC 639.512

Bambang Iswanto, Rommy Suprpto, and Imron (Research Center for Fisheries)

Establishing a base population of individual selection for low maintenance requirements in term of dietary protein level in the African catfish (*Clarias gariepinus*)

Indonesian Aquaculture Journal, 14 (1), 2019, 23-29

The farming industry of the African catfish (*Clarias gariepinus*) in Indonesia is affected by a high feed cost during the grow-out phase resulting in low economic return. Selective breeding to produce new strains with low maintenance requirements is one of the potential solutions to overcome the problem. The present study aimed to identify and study the performance of the base population of African catfish treated with feed low in dietary protein during the grow-out phase. Out of 100 broodstock pairs, 96 pairs had produced successful hatching. Approximately 1,000 larvae from each pair were reared separately to reach seven-week-old juveniles. Then, 50 individuals from each pair were selected to form the base population. The base population was reared for four months and fed with commercial feed containing 12% crude protein resulting in final mean body weight of  $82.04 \pm 34.66$  g, a specific growth rate of 2.02%/day, a feed conversion ratio of 4.23, and survival rate of 25.15%. At the end of the grow-out phase, the size variation among treated fish was relatively high (variation coefficient of 42.31%). The subsequent individual selection stage had identified that 325 individuals (equal to 26.93% of the total population) had the best performances with a mean body weight of  $128.80 \pm 22.80$  g, selection differential of 46.80 g, and selection intensity of 1.35. These results suggested the potency of the selected base population be used in the forming of the next generation.

KEYWORDS: African catfish (*Clarias gariepinus*); base population; body weight; dietary protein level; individual selectionshrimp larvae.

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Asda Laining, Ike Trismawanti, Usman, and Muhammad Hafid Masruri (Institute for Freshwater Aquaculture Research and Fisheries Extension)

Influence of squid liver meal in maturation diet on gonadosomatic index and gonadal amino acid content of golden spotted rabbitfish, *Siganus guttatus*

Indonesian Aquaculture Journal, 14 (1), 2019, 31-38

A four months feeding trial was conducted to evaluate the effects of two maturation diets containing either fishmeal (FM) or squid liver meal (SLM) as the major protein source on growth, gonadosomatic index and gonadal bio-chemical profiles of golden spotted rabbitfish, *Siganus guttatus*. The two tested diets were formulated to be iso-nitrogenous (40%) and iso-lipidic (14%) and supplemented with several micronutrients specifically for gonadal development. The initial weight of golden spotted rabbitfish used were  $352.6 \pm 45.0$  g and stocked into four of 2 m x 2 m x 2.5 m net cages with 25 fish per cage. The test diets were fed to the stocks twice a day. After four months feeding, the weight gains (WG) of broodstock fed the two diets were nearly similar in which FM had WG of  $40.1 \pm 2.2\%$  and  $42.8 \pm 2.0\%$  for SLM. The GSI of male fed SLM diet was similar to that of fed with FM. However, the GSI of female fed FM was  $5.6 \pm 0.1\%$  significantly lower ( $P < 0.05$ ) than SLM which was  $11.4 \pm 0.5\%$ . Furthermore, total amino acid (TAA) in spermatocyte was significantly ( $P < 0.05$ ) influenced by dietary SLM indicated by its higher TAA (62.4%) compared to TAA content of FM group (46.1%). Similarly, the TAA content in oocyte was significantly ( $P < 0.05$ ) improved when fed SLM. The dietary SLM did not affect the TAA content in the fillet of rabbitfish demonstrated by the similarity of the fillet TAA content in the two groups which was 55.6% for FM and 54.1% for SLM. Dietary SLM enhanced GSI of female broodstocks and profile of amino acid in the gonad of golden spotted rabbitfish, *Siganus guttatus*.

KEYWORDS: squid liver meal; maturation diet; gonadal amino acid content; gonadosomatic index; rabbitfish

UDC 639.512

Isti Koesharyani, Ariani Andayani, Ulfah Fayumi, and Ketut Sugama (Research Institute for Coastal Aquaculture and Fisheries Extension)

Surveillance of white spot syndrome virus (WSSV) and myonecrosis virus (IMNV) infections in cultured *Litopenaeus vannamei*  
Indonesian Aquaculture Journal, 14 (1), 2019, 39-45

Disease surveillance programs will provide updated information on the distribution of diseases which allows proper development of mitigation and prevention strategies. WSSV and IMNV viruses are the most threatening diseases in shrimp and have affected the global shrimp farming industries. The present study was conducted to investigate the prevalence of WSSV and IMNV in three different locations of shrimp farms of South Sulawesi, West Nusa Tenggara and West Java. Samples of shrimp *Litopenaeus vannamei* were randomly collected from 20 active shrimp farms in the locations and five samples of postlarvae (PL) that were stocked in ponds. Tissue samples of the shrimp and whole body of PL were preserved in ethanol 90% for analysis. Determination of WSSV and IMNV were carried out by the mobile IQ™ WSSV and IQ™ IMNV Kit POCKIT Systems. The results showed that the prevalence of WSSV was 30% (6/20) and IMNV was 20% (4/20), while on PL was 40% (2/5). The result revealed that the South Sulawesi (Takalar) samples were positive only for WSSV while West Java (Panimbang) samples were positive only for IMNV. A follow-up study predicted that both viruses were transmitted from the PLs. The present study clearly confirmed that viruses were transmitted from PLs that were not free from either WSSV or IMNV. Therefore, a biosurveillance program is strongly recommended to be implemented in order to avoid the spread of the viral disease to other locations within Indonesia.

KEYWORDS: infectious; WSSV; IMNV; *Litopenaeus vannamei*; IQ™ Kit pockit

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# SEND INSTRUCTIONS FOR WRITING AND PUBLISHING ARTICLES OF INDONESIAN AQUACULTURE JOURNAL 2016 (12pt Bold)

I Nyoman Adiasmara Giri<sup>#</sup>, Ketut Sugama<sup>\*\*</sup>, Alimuddin<sup>\*\*\*</sup>, and Anang Hari Kristanto<sup>\*\*\*\*</sup>

<sup>\*</sup>) Research and Development Institute for Mariculture, Gondol

<sup>\*\*</sup>) Center for Fisheries Research and Development, Jakarta

<sup>\*\*\*</sup>) Bogor Agricultural University, Bogor

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

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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

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

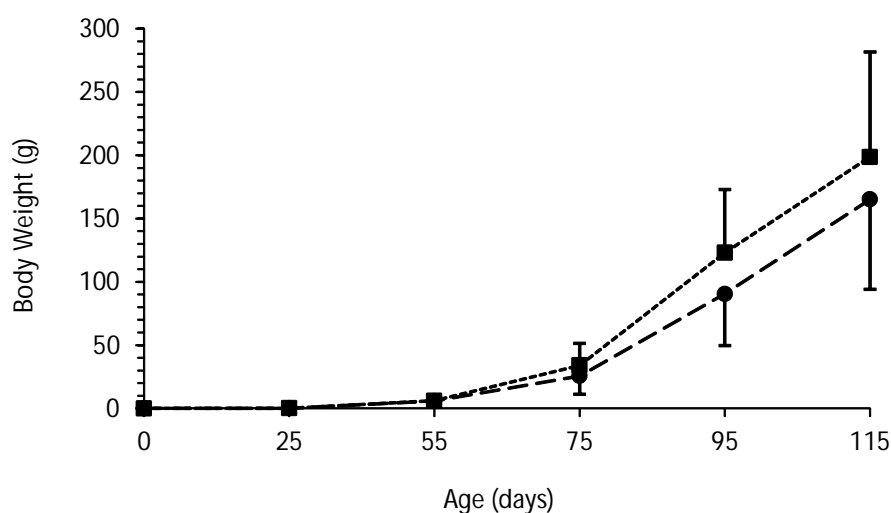


Figure 1. Growth performances based on body weight during 25 days of larval rearing phase, 30 days of nursery phase and 60 days of grow-out phase (based on samplings of 2% populations) of the third generation (■) and control population (●) of the African catfish (*Clarias gariepinus*) genetic improvement 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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## 10. Acknowledgements

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## 11. References

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