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Puerulus Quality and Viruses Disease Identification from Cultured Spiny Lobster (*Panulirus homarus*) with Polymerase Chain Reaction

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A B S T R A C T

Indonesia waters endowed with huge number of puerulus. Fisheries of puerulus able to supported wealthy of fisherman. Puerulus previously was sold as abroad trade commodity and seed for aquaculture of spiny lobster in Indonesia. Commercialization of aquatic product always related with quality and free from virus disease that may support aquaculture of spiny lobster sustainability. This study aimed to evaluate physical quality and white spot syndrome virus disease detection of spiny lobsters puerulus from Sukabumi Regency, Palabuhan Ratu waters. Second aimed of studied was to detect viruses disease infection on cultured juveniles scalloped spiny lobster (*Panulirus homarus*). Binocular microscope and polymerase chain reaction were methods used for physical assessment and viruses disease infection. Results showed that variety of puerulus organs damages due to catching methods. Puerulus also showed empty gut (hepatopancreas and intestines) due to non-feeding phase. Moreover, high quality of puerulus also showed with free from White Spot Syndrome Virus and fulfil national quarantine requirement. After culture within one month in floating cages, juveniles of scalloped spiny lobster also free from viruses disease except from Taura Syndrome Virus. TSV disease that infected juveniles scalloped spiny lobster need to respond with new standard operational procedure of mariculture within parameters of source, transmission pathway and pathogenicity of virus in captive environment.

Keywords: polymerase chain reaction; puerulus; quality; spiny lobster; virus disease

Introduction

Indonesia waters endowed with huge number of puerulus such Lombok waters in Eastern Indonesia in 2014 was 5,2 million (Priyambodo *et al*., 2020). Fisheries of puerulus able to supported wealthy of fisherman with simply equipment and methods (Phillips & Booth, 1994). Puerulus previously was sold as abroad trade commodity and seed for aquaculture of spiny lobster in Indonesia. Even tough, fluctuations of puerulus settlement occurred in many waters, conserving (Linnane *et al*., 2012) also exploited puerulus for commercial product need to develop due to economical value provide by puerulus for fisherman wealth and living income.

Commercialization of aquatic product always related with quality and free from virus disease that may support aquaculture of spiny lobster sustainability. However, there are no recent studies discuss with focus on puerulus quality due to limitation access and national area supported. Quality of puerulus in particular uncomplete organs in relation with functional physiology (MacWilliam & Phillips, 1997) can disturb unfunctional organ example losing antenna receptors in puerulus will reduce ability of navigation (Macmillan *et al*., 1992) and metamorphosis (MacWilliam & Phillips, 2007). Furthermore, quality of puerulus also related to disease infection in particular virus disease containment. OIE as international institutions for disease infection in aquatic animals recorded many virus diseases and its policy followed by many countries over the world (Lee *at al*., 2022). This studied have two aimed that evaluate physical quality and white spot syndrome virus disease detection of spiny lobsters puerulus and viruses disease infection on cultured juveniles scalloped spiny lobster (*Panulirus homarus*).

Materials and Methods

Assesment of puerulus of spiny lobster quality were taken from Palabuhan Ratu waters in Sukabumi Regency of West Java Province, Indonesia. Total amount of puerulus sampled were 100 individuals, catched by local fisherman with one-night fishing and kept in fresh seawater before analyzed (Fig.1). Binocular microscope with camera was used for puerulus quality evaluation within 100 individuals. Damages organ, broken antenna and antenulla, not

complete pereipods and pleopods, and white spot syndrome virus (WSSV) analysis used polymerase chain reaction were parameters used in quality of puerulus. WSSV analysis followed OIE (2022d) with two individuals of puerulus from two different species. Assesment of cultured spiny lobster begin with grow-out of puerulus in floating cages in Lampung bay of Sumatera Indonesia. Puerulus were given from Main Centre for Marine Aquaculture Development of Lampung in total amount of 1000 individuals for viruses disease quality assessment of cultured scalloped spiny lobster. Puerulus kept in captivity with floating net cages with size 3 x 3 x 3 m with 50 individuals per cage. Puerulus cultured for 1.5 months until body weight reached 15-20 g. Five individual of cultured scalloped spiny lobster were taken as a sample for viruses disease infection. Five viruses disease were analysed followed OIE methods. Those viruses disease infection were WSSV, Infectious Hypodermal and Haematopoietic Necrosis Virus (IHHNV) (OIE, 2022a), Infectious Myonecrosis Virus (IMV) (OIE, 2022b), Taura Syndrome Virus (TSV) (OIE, 2022c), Enterocytozoon Hepatopenaei (EHP) (Jithendran *et al*., 2021). All results presented with figures and analysed with comparison to references, descriptively.

Fig. 1 - Puerulus or non-pigmented spiny lobster (*Panulirus*) sample from Palabuhan Ratu waters.

Results and Discussion

There were no information regarding puerulus quality that may support sustainable fisheries in common, and mariculture particulary for Indonesia. One hundred puerulus sampled showed two species i.e. *Panulirus homarus* and *Panulirus ornatus*. Both were two species most common found in Indonesian waters (Priyambodo *et al*., 2015) and have high prices. Even though, puerulus not yet revealed use for seed in enlargement in Indonesia but illegally sold to Vietnam mainly and several areas in South East Asia and China (Priyambodo *et al*., 2020). Due to dark market of puerulus and permit requirement bureaucracy, it is possible as main reason that not many studies of puerulus quality parameters that even important for sustainable trade fisheries commodity in future (Gardner *et al*., 2006).

Results from this study showed mostly physical damages of organs of puerulus in example broken antenna, broken pleopods due to catching methods and handling procedure that not gently prepared (Fig.2). Organs damages related to puerulus ability and survive during metamorphosis (Deshmukh, 1963) and surviving in captive environment (Phillips & Macmillan, 1987). Puerulus was tiny creatures and fragile if not handled carefully (Phillips & McWilliam, 2009). Puerulus also known has aggressive behaviour (Berill, 1976) in the situations following ocean current (Calinski & Lyons, 1983), interact with light (Matsuda *et al*., 2012) and net surrounding trap, may try to escape but not able due to many layers on trap and puerulus get damages in several organs. Moreover, hepatopancreas and intestines of puerulus also showed minimal metabolism (Fig.2). It is described by Lemmens (1994), puerulus in non-feeding phase due to uncomplete metabolism development and naturally do not want attracted predator with body color that contain from natural feed. Lemmens & Knott (1994) also supported non-feeding puerulus with reason internal feeding structure within metamorphosis phase and those changes related to nucleic acid-cellular activity and growth of puerulus (Lemmens, 1995).

Fig. 2 - Puerulus organs damages due to catching methods and non-functional gut with no feed (100x magnification).

Virus disease in crustaceans is very important for survival indicator related with sustainability of aquaculture. Many viral infection records caused high mortality from short period or relatively long period of culture (Lee *et al*., 2022). Once, WSSV is heaviest disease-causing mortality in crustaceans for many decades and free from this virus has been use for many national quarantine methods before trans-trading within countries. Puerulus assessment from this studied showed two species of puerulus were free from WSSV or showed negative results. These situations not only showed high quality of peurulus from Palabuhan Ratu waters but also good example for many puerulus sources in several areas in Indonesia that committed to develop spiny lobster aquaculture village or Kampung Lobster that has been announce as Indonesia fisheries national program to supported fishers living.

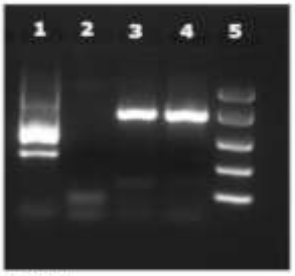

Fig. 3 - Electrophoresis 2% agarose negative results of white spot syndrome virus (WSSV) of puerulus.

Culturing puerulus to juveniles in captive environment need specific supported mainly precise environment and feed (Matsuda *et al*., 2012). Juveniles of scalloped spiny lobster were having been cultured in floating cages also supported high quality and bright future prospect for its culture sustainability. Within five virus infection that were assessed, only TSV was detected or has positive results. It is surprisingly, that TSV able to detect in spiny lobster due to this virus originally recorded in black tiger shrimp (*Penaeus monodon*) (Lee *et al*., 2022). Moreover, other four virus causing diseased such as WSSV, IMNV, EHP and IHHNV not detected in juvenile's spiny lobster even surrounding location of culture also placed with Pacific white shrimp (*Litopenaeus vannamei*) ponds. However, the positive results of TSV infection need to respond with develop new standard operating procedure to guarantee minimize infection and transmission effects on spiny lobster cultured system.

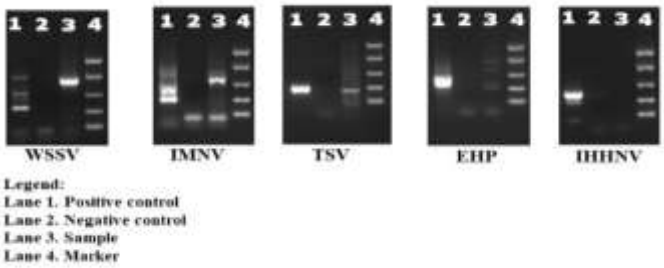

Fig. 4 - Electrophoresis 2% agarose viruses disease infection results of cultured scalloped spiny lobster (*Panulirus homarus*). Taura syndrome virus (TSV) showed positive result.

4. Conclusions

Physical damages of puerulus due to catching methods may supported approach of new catching and handling methods that reduce damages. Identified TSV disease should respond with develop standard operating procedure to minimize infection and transmission effects on spiny lobster cultured system.

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References

Berill, M. (1976). Aggressive behaviours of post-puerulus larvae of the Western rock lobster *Panulirus longipes* (Wilne-Edwards). *Australian Journal Marine and Freshwater Research, 27*, 83-88.

Calinski, M.D., & Lyons, W.G. (1983). Swimming behavior of the puerulus of the spiny lobster *Panulirus argus* (Latreille, 1804) (Crustacea: Palinuridae). *Journal of Crustacean Biology, 3*, 329-335.

Deshmukh, S. (1963). The puerulus of the spiny lobster *Panulirus polyphagus* (Herbst) and its metamorphosis into the post-puerulus. *Crustaceana, 10*, 137-150.

Gardner, C., Frusher, S., Mills, D., & Oliver, M. (2006). Simultaneous enhancement of rock lobster fisheries and provision of puerulus for aquaculture. *Fisheries Research, 80*, 22-128.

Jithendran, K.P., Poornima, M., Patil, P.K., Otta, S.K., Praveena, P.E., Raja, R.A., Kumar, S. T. Bhuvaneswari, T., Rajendran, V., & Kumar, T.S. (2021). Hands on Training on Diagnostics and Management of Enterocytozoon Hepatopenaei (EHP) in Shrimp, Training Manual Series No.23, 102 pp.

Lee, D., You, Y.B., Choi, J.-H., Jo, A.H., Hong, S.-M., Kang, J.-C., & Kim, J.-H. (2022). Viral shrimp disease listed by the OIE: a review. *Viruses*, 14, 585.

Lemmens, J.W.T.J., & Knott, B. (1994). Morphological changes in external and internal feeding structures during the transition phyllosoma-puerulus-juvenile in the Western rock lobster (*Panulirus cygnus*, Decapoda:Palinuridae). *Journal of Morphology, 220*, 271-280.

Lemmens, J.W.T.J. (1994). Biochemical evidence for absence of feeding in puerulus larvae of Western rock lobster *Panulirus cygnus* (Decapoda: Palinuridae). *Marine Biology, 118*, 383-391.

Lemmens, J.W.T.J. (1995). Nucleic acid levels, celluar activity and growth during the puerulus stage of the Western rock lobster (*Panulirus cygnus* (George); Decapoda:Palinuridae). *Journal of Experimental Marine Biology and Ecology, 194*, 143-156.

Linnane, A., McGarvery, R., Hoare,M., & Hawthorne, P. (2012). The importance of conserving recruitment pulses in rock lobster (*Jasus edwardsii*) fisheries where puerulus settlement is low or highly sporadic. *Marine Biology Research, 9*, 97-103.

Macmillan, D.L., Phillips, B.F., & J.A.Coyne, J.A. (1992). Further observations on the antennal receptors of rock lobsters and their possible involvement in puerulus stage navigation. *Marine Behaviour and Physiology*,19, 211-225.

Matsuda, H., Abe, F., & Tanaka, S. (2012). Effect of photoperiod on metamorphosis from phyllosoma larvae to puerulus postlarvae in Japanese spiny lobster *Panulirus japonicus. Aquaculture, 326-329*, 136-140.

McWilliam, P.S., & Phillips, B.F. (1997). Metamorphosis of the final phyllosoma and secondary lecithotrophy in the puerulus of *Panulirus cygnus* George: a review. *Marine and Freshwater Research, 48*, 783-790.

McWilliam, P.S., & Phillips, B.F. (2007). Spiny lobster development: mechanism inducing metamorphosis to the puerulus: a review. *Review of Fish Biology and Fisheries, 17*, 615-632.

OIE. (2022a). Infection with Infectious Hypodermal and Haematopoietic Necrosis Virus. Chapter 2.2.4. Aquatic Manuals Online Access. Manuals of Diagnostics Tests for Aquatic Animals 2022. Edition 01/02/2023. https://www.woah.org/en/what-we-do/standards/codes-and-manuals/aquatic-manual-online-access/. Access on 2023/04/26.

OIE. (2022b). Infection with Infectious Myonecrosis Virus. Chapter 2.2.5.Aquatic Manuals Online Access. Manuals of Diagnostics Tests for Aquatic Animals 2022. Edition 01/02/2023. https://www.woah.org/en/what-we-do/standards/codes-and-manuals/aquatic-manual-online-access/. Access on 2023/04/26.

OIE. (2022c). Infection with Taura Syndrome Virus. Chapter 2.2.7. Aquatic Manuals Online Access. Manuals of Diagnostics Tests for Aquatic Animals 2022. Edition 01/02/2023. https://www.woah.org/en/what-we-do/standards/codes-and-manuals/aquatic-manual-online-access/. Access on 2023/04/26.

OIE. (2022d). Infection with White Spot Syndrome Virus. Chapter 2.2.8. Aquatic Manuals Online Access. Manuals of Diagnostics Tests for Aquatic Animals 2022. Edition 01/02/2023. https://www.woah.org/en/what-we-do/standards/codes-and-manuals/aquatic-manual-online-access/. Access on 2023/04/26.

Phillips, B.F., & Booth, J.D. (1994). Design, use and effectiveness of collectors for catching the puerulus stage of spiny lobster. *Reviews in Fishereis Science, 2*, 255-289.

Phillips, B.F., & Macmillan, D.L. (1987). Antennal receptors in puerulus and postpuerulus satges of the rock lobster *Panulirus cygnus* (Decapoda: Palinuridae) and their potential role in puerulus navigation. *Journal of Crustacean Biology, 7*, 122-135.

Phillips, B.F., & McWilliam, P.S. (2009). Spiny lobster development: where does successful metamorphosis to the puerulus occur?:a review. *Review of Fish Biology and Fisheries, 19*, 193-215.

Priyambodo, B., Jones, C., & Sammut, J. (2015). The effect of trap type and water depth on puerulus settlement in the spiny lobster aquaculture industry in Indonesia. *Aquaculture, 442*, 132-137.

Priyambodo, B., Jones, C., & Sammut, J. (2020). Assessment of the lobster puerulus (*Panulirus homarus* and *Panulirus ornatus*, Decapoda:Palinuridae) resources of Indonesia and its potential for sustainable harvest for aquaculture. *Aquaculture, 528*, 735563

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