JOURNAL OF AQUACULTURE DEVELOPMENT AND ENVIRONMENT

VOLUME 1 NOMOR 1 TAHUN 2018

Faculty of Agriculture, Study Program Of Aquaculture
Universitas Tidar

Publisher Address:
Jalan Kapten Suparman No.39 Magelang 56116, Telp (0293) 364113, Fax (0293) 362438
Website: http://jurnal.untidar.ac.id/index.php/jade
Email: jade@untidar.ac.id

Journal Of Aquaculture Development And Environment

Editorial Team

Editor

Desain Layout

ISSN: 2655-545X

Journal of Aquaculture Development and Environment

P ISSN : 2654-4458

E ISSN : 2655-545X

The focus and scope of the research is related to the discussion of the development of aquaculture in general and the environment.

Publisher Program Studi Akuakultur, Fakultas Pertanian, Universitas Tidar

Announcements

No announcements have been published.

More Announcements...

Vol 5, No 2 (2022): Journal Of Aquaculture Development And Environment

Table of Contents

Articles

FEASIBILITY SIMULATION OF EEL (Monopterus albus) CULTIVATION IN CLEAR WATER PDF 319-322

Muh Sulaiman Dadiono, (Fakultas Perikanan dan Ilmu Kelautan, Universitas Jenderal Soedirman, Indonesia)
Rudy Wijaya, (Fakultas Perikanan dan Ilmu Kelautan, Universitas Jenderal Soedirman, Indonesia)
Mustika Palupi, (Fakultas Perikanan dan Ilmu Kelautan, Universitas Jenderal Soedirman, Indonesia)
Ren Fitriadi, (Fakultas Perikanan dan Ilmu Kelautan, Universitas Jenderal Soedirman, Indonesia)
Rima Oktavia Kusuma, (Fakultas Perikanan dan Ilmu Kelautan, Universitas Jenderal Soedirman, Indonesia)

10.31002/jade.v5i2.6678 | Abstract views : 0 | PDF views : 0

CULTIVATION TECHNIQUES OF PEARL CATFISH (Clarias sp.) IN THE PARIKESIT COMMUNITY GROUP OF SUMURGUNG VILLAGE, TUBAN DISTRICT, TUBAN DISTRICT, EAST JAVA PDF 323-327

Ananda Putri Arofah, (Airlangga University, Indonesia)
Fenny Diyah Retnosari, (Airlangga university, Indonesia)
Naila Nur Fauziah, (Airlangga university, Indonesia)
Wahyu Wahyu Isroni, (Airlangga university, Indonesia)

10.31002/jade.v5i2.7134 | Abstract views : 0 | PDF views : 0

FISH HATCHERY TECHNIQUE OF WADER PARI (Cyprinus carpio) IN CULTIVATION FISHERIES PDF

Focus and Scope
Peer Review Process
Open Access Policy
Author Guidelines
Copyright Notice
Author Fees
Editorial Team
Reviewer Team
Publication Ethics
Abstracting & Indexing
Policy of Screening for Plagiarism
Contact

USER

Username
Password
Remember me
Login

JOURNAL CONTENT

Search
Search Scope
All
Search

Browse
» By Issue
» By Author
» By Title
» Other Journals

INSTALLATION KEPANJEN MALANG JAWA TIMUR 328-332

Lusiana BR Ritonga, (Politeknik Kelautan dan Perikanan Sidoarjo, Indonesia)
Asep Akmal Aonullah, (Politeknik Kelautan dan Perikanan Sidoarjo, Indonesia)
Heni Wardania Rakhma, (Politeknik Kelautan dan Perikanan Sidoarjo, Indonesia)

10.31002/jade.v5i2.6817 | Abstract views : 0 | PDF views : 0

Monitoring of Water Quality on Rearing Intensive Ponds of Vannamei Shrimp (Litopenaeus vannamei) in CV. Tirta Makmur Abadi Lombang PDF 333-339

Lusiana BR Ritonga, (Politeknik Kelautan dan Perikanan Sidoarjo, Indonesia)
Anja Asmarany, (Politeknik Kelautan dan Perikanan Sidoarjo, Indonesia)
Asep Akmal Aonullah, (Politeknik Kelautan dan Perikanan Sidoarjo, Indonesia)
M. Firmanda Yuwandika, (Politeknik Kelautan dan Perikanan Sidoarjo, Indonesia)

10.31002/jade.v5i2.7179 | Abstract views : 0 | PDF views : 0

The Effect of Temperature Differences on The Gonad Maturity Levels and Embryogenesis of Vaname Shrimp Broodstock (Litopenaeus vannamei) PDF 340-342

Sultan Wiguna Dinata, (Airlangga University, Indonesia)
Endang Dewi Masithah, (Airlangga University, Indonesia)
Wahyu Isroni, (Airlangga University, Indonesia)

10.31002/jade.v5i2.7290 | Abstract views : 0 | PDF views : 0

ISSN: 2655-545X

The Effect of Temperature Differences on The Gonad Maturity Levels and Embryogenesis of Vaname Shrimp Broodstock (*Litopenaeus vannamei*)

Sultan Wiguna Dinata[1*],Endang Dewi Masithah[1], Wahyu Isroni[1]

[1]*Faculty of Fisheries and Marine, Airlangga University*
*Email : sultanwiguna13@gmail.com

Abstract

Vaname shrimp cultivation in Indonesia is currently the mainstay of the aquaculture sector, in the 2012 - 2018 period, the contribution of the export value of vaname shrimp to the export value of Indonesian fisheries averaged 36.27%. The production of cultivated shrimp nationally has increased rapidly in the last 5 years with an average annual increase of 10.38%. To increase the production of vaname shrimp, it is necessary to observe the factors that can accelerate the level of gonadal maturity and embryogenesis in vaname shrimp. One of the environmental factors that affect the level of gonadal maturity and embryogenesis is temperature, temperature affects the sinus glands to accelerate the development of gonadal maturity levels, temperature also affects the process of embryo development, at high temperatures the shrimp metabolism rate increases and embryo development occurs more quickly. This research is experimental by using a Completely Randomized Design (CRD). This studyused four treatments, namely four temperature treatments, including 28°C, 30°C, 32°C, and 34°C. The results of the study were analyzed using ANOVA (Analysis of Variance) and continued with Duncan's Multiple Range Test. The results of this study indicate that temperature differences affect the level of gonadal maturity level (GML)and embryogenesis in the spawning process of vaname shrimp (Litopenaeus vannamei) broodstock ($p<0.05$). The treatment that had a major influence on the level of gonadal maturity level (GML) was the 34°C treatment with 8 days and the fastest embryogenesis treatment at 34°C with 387.3 minutes.

Keywords: *Litopenaeus vannamei*, gonad maturity level, embryogenesis

Introduction

Vannamei shrimp is a native species of Pacific waters that can be found on the west coast of Mexico to Peru. This shrimp was introduced for cultivation in Asia in 1996 in Taiwan by importing vannamei shrimp parent candidates from Hawaii. Furthermore, these efforts returned to China, Myanmar, Indonesia, and several countries in Southeast Asia. Vannamei shrimp has several advantages compared to other species, namely, the growth rate reaches 1-1.5 g/week, it can be cultivated with a high stocking density of around 80-500 individuals/m2, vannamei shrimp are also tolerant of salinity 0.5-45 ppm, as well as the harvest size, is uniform and the number of undersize is lower. (KKP, 2021).

Observation of factors that can accelerate the level of gonadal maturity and embryogenesis in vannamei shrimp is still rarely carried out, especially regarding environmental factors, one of the environmental factors that affect the level of gonadal maturity and embryogenesis is temperature, temperature affects the sinus glands to accelerate the development of gonadal maturity levels. , temperature also affects the process of embryo development, at high temperatures the shrimp metabolic rate increases and embryo development occurs more quickly. One alternative way to increase vannamei shrimp production is to carry out temperature treatment to accelerate gonadal maturity and embryogenesis in vannamei shrimp.

Based on the description above, the researchers conducted a study entitled "The Effect of Temperature Differences on Gonad Maturity Levels and Embryogenesis in Vaname Shrimp (*Litopenaeus vannamei*) Broodstock".

Methods

The method used in this research is experimental or trial. The research design used was a completely randomized design (CRD) using 4 treatments with 3 replications for each treatment. The treatment given was a temperature difference design in observing the level of gonadal maturity and embryogenesis of vaname shrimp (*Litopenaeus vannamei*).

Results and Discussion

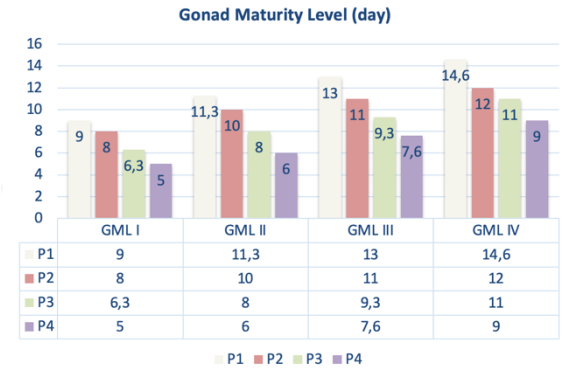

Figure 1.

Based on figure 1, P3 and P4 provide a faster response time needed to achieve GML I and II compared to P1 and P2. To reach GML I at temperature P4 it takes 5 days, at P3 it takes 6.3 days, at P2 it takes 8 days, while at P1 it takes 9 days. To achieve GML II at P4 it takes 6 days, at P3 it takes 8 days, at P2 it takes 10 days, while at temperature P1 it takes 11.3 days. To achieve GML III at P4 it takes 7.6 days, at P3 it takes 9.3 days, at P2 it takes 11 days, while at P1 it takes 13 days. To achieve GML IV, P4 takes 9 days, P3 takes 11 days, P2 takes 12 days, and P1 takes 14.6 days. This time difference gets smaller as we reach GML IV. This shows that the higher the treatment temperature, the faster the maturity level of the gonads. This is following the statement of Saputra (2013) which states that the maturity of the gonads of shrimp is influenced by 2 factors, namely internal factors and external factors. Internal factors include species and age. While external factors that influence include: temperature, food availability, water flow, and high rainfall. Stimulation from outside can affect the central nervous system which can inhibit organ X from producing Gonad Inhibiting Hormone (GIH). (Tiu and Chan, 2007).

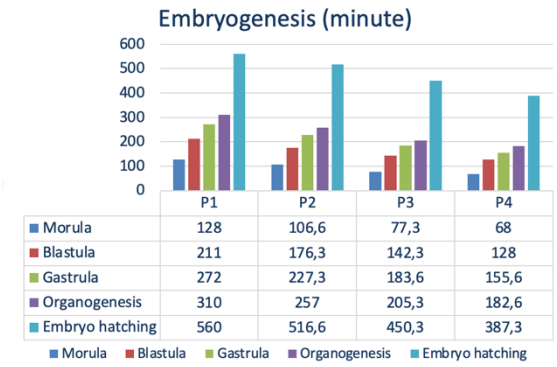

Figure 2.

Figure 2 shows that at the Morula stage, the fastest treatment was P4 with a time of 68 minutes, then P3 with a time of 77.3 minutes, P2 with a time of 106.7 minutes, and the slowest was P1 with a time of 128 minutes. At the Blastula stage, the treatment with the fastest time to reach this stage was P4 with 128 minutes and P1 showed the slowest time with 211 minutes. P2 takes 176.3 minutes, while P3 takes 142.3 minutes. At the Gastrula stage, P4 was also superior compared to other treatments with a time of 155.6 minutes, followed by P3 with a time of 183.6 minutes, P2 took 227.3 minutes and P1 took the longest with 272 minutes. At the stage of organogenesis, P4 was still the fastest to reach this stage with a time of 182.6 minutes, then followed by P3 with 205.3 minutes, then P2 took 257 minutes, and finally P1 with 310 minutes. At the last stage of embryo hatching, P4 was still the fastest to reach this stage with a time of 387.3 minutes, followed by P3 with a time of 450.3. P2 takes 516.6 minutes and the last one is P1 with a record time of 560 minutes. According to Andrianto et al. (2013), stated that temperature changes greatly affect the development of the embryo, because it affects the speed of metabolism, metabolism is a biochemical process that occurs in the body which is strongly influenced by temperature.

Water Quality Parameters	Temperature 28°C (P1)	Temperature 30°C (P2)	Temperature 32°C (P3)	Temperature 34°C (P4)	SNI 8037.1:2014
DO (mg/L)	7,84 – 8,14	7,49 – 8,04	6,08 – 6,54	5,68 – 6,12	>4,0
Temperature (°C)	28,1 – 28,9	30,1 – 30,7	32 – 35,6	34 – 34,6	28 – 33
pH	7 – 8,2	6,2 – 8,1	6,3 – 7,3	5,8 – 7,1	7,5 – 8,5
Salinity (ppt)	32-33	32-34	32-34	32-34	25 – 30

Table 1

The results of measuring water quality parameters at 28°C, 30°C, 32°C, and 34°C showed differences in temperature, dissolved oxygen (DO), pH, and salinity. Dissolved oxygen at 34°C showed a lower value of 5.68-6.12 mg/L, while at 28°C, 30°C and 34°C dissolved oxygen reached 7.84-8.14 mg/dL, 7.49-8.04 mg/L, and 6.08-6.54 mg/L. The temperatures in these four studies ranged from smallest to lowest, namely at a temperature of 28.1-34.6°C with different values for each treatment. P1 showed the lowest temperature, namely 28.1-28.9°C, while the temperatures of other treatments showed higher, including P2 30.1–30.7°C, P3 32–34.6°C, and P4 34 –34.6°C. pH at 34°C temperature treatment showed the lowest value of 5.8–7.1 while at 28°C, 30°C and 34°C the pH

reached 7–8.2.6–8.1, and 6, 3–7,3. Salinity at 28°C showed the lowest value, namely 32–33 ppt, while other treatments at 28°C, 30°C, and 34°C showed the same salinity, namely 32–34 ppt.

The temperature range that is said to be good for the life of the vaname shrimp brood according to SNI 8037.1: 2014 is 28°-33°C. The results of pH measurements during maintenance ranged from 5.8-8.2 which is not following SNI 8037.1:2014. This can occur due to changes in pH values that vary depending on seawater temperature, dissolved oxygen concentrations, and the presence of anions and cations (Kumar et al., 2012). While the results of measuring salinity in the holding water of vaname shrimp broodstock are around a value of 32-34 ppt where this value is not following SNI 8037.1: 2014, especially at a salinity of 34 ppt.

Supono (2015) states that a high salinity value is caused by a high rate of water evaporation (evaporation of water) due to high temperatures coupled with a low level of mixing of new water, besides that it can also adversely affect shrimp osmoregulation. Vaname shrimp can live in the salinity range (0-31) ppt, but still grow well at (15-25) ppt and optimally at salinity (25-30) ppt (Hirono, 1992).

Conclusion

The difference in temperature affects the Gonad Maturity Level (GML) of vaname broodstock (*Litopenaeus vannamei*) ($p<0,05$). The treatment that has a major influence on the level of gonadal maturity (GML) is P4 (34°C) treatment within 9 days. The treatment that had the most direct effect on the process of embryogenesis was P4 (34°C) with a time of 387.3 minutes.

References

Andrianto, W., B. Slamet, D. J. Ariawan. 2013. Perkembangan Embrio dan Rasio Penetasan Telur Ikan Kerapu Raja Sunu (*Plectropema laevi*) pada Suhu Media Berbeda. Jurnal Ilmu Kelautan dan Teknologi Kelautan Tropis, 5(1):192 -203.

KKP, 2021. Budidaya Udang Vaname (*Litopenaeus vannamei*) di TambakMilenial Shrimp.

Kumar K. P., Jetani S. I., A. N. Yusuzai, Sayani, Shabir Ahamd Dar, Mohd Ashraf Rather. 2012. Effect of Sediment anad Water Quality Parameters on The Productivity of Coastal Shrimp Farm. Adv. In. Appl Sci Res: 3(4): 2033-2041.

Saputra, S.W., Djuwito&ARutiyaningsih. 2013. Beberapa Aspek Biologi Udang Putih (*Penaeus merguiensis*) di Perairan Pantai Cilacap Jawa Tengah. Management of Aquatic Resources Journal. UNDIP. Vol 2 (3): 49-55.

Tiu, Shirley Hiu-Kwan and Chan, Siu-Ming. 2007. The use of recombinant protein and RNA interference approaches to study the reproductive functions of a gonad-stimulating hormone from the shrimp Metapenaeus ensis. FEBS Journal. 274 (1): 4386 – 4396.

Y. Hirono. 1992. Current Practices of Water Quality Management in Shrimp Farming and Their Limitations. In: Wyban J (Editor). Proceedings of The Special Session on Shrimp Farming. USA: World Aquaculture Society.