JOSBP

Journal of Sustainable Business Practices

Volume 1, Issue 1, June 2023
ISSN 2988-165X (Online)
https://sustainable.my.id/index.php/josbp

The Effectiveness of Utilizing Different Natural Foods on the Survival of Pearl Catfish (*Clarisa gariepinus*) in the Post Larvae and Juvenile Phases

Enni Mutiati[a*], Lailatul Maghfiroh[b]
[a] The Lecturer at the institute of science and technology Annuqayah Sumenep
[b] Students at the institute of science and technology Annuqayah Sumenep

Correspondence: enni.mutiati@gmail.com

ARTICLE INFO

Article history
Received
April 2023
Revised
May 2023
Accepted
June 2023

Keywords

Effectiveness
Natural Foods
Pearl Catfish
Post Larvae
Juvenile

ABSTRACT (10pt)

Pearl Catfish (*Clarias ganriepinus*) is one of the freshwater fishery commodities that has high marketing, it reaches world marketing and ranks 13th in production in the world. However, in its growth process, catfish need feed that contains sufficient nutritional value and more economical so that breeder can get more benefits, especially in the post-larval and juvenile phases. The purpose of this research is for breeder to utilize natural feed more effectively so that the survival of the Pearl Catfish (*Clarisa gariepinus*) is higher than usual during times of vulnerability to death. The type of research used is descriptive qualitative. The data collection techniques by observation, interviews, and documentation. The survival rate of the Pearl Catfish (Clarisa gariepinus) is calculated using the formula as SR= Nt/Nox 100%. Data analysis in this research was carried out descriptively. The results of this research indicated that feeding silk worms (*Tubifex* sp) experienced good growth with the lowest mortality rate compared to fengli 0 and boiled egg yolk, which was around 10%. This shows that the survival rate of the Pearl Catfish (*Clarias gariepinus*) is in the good category. As for feeding fengli 0, the survival rate for Pearl Catfish (*Clarias gariepinus*) is quite good, because the death rate reaches 30% . For natural food which was used boiled egg yolk, the survival rate for Pearl Catfish (*Clarias gariepinus*) is not good, because the death rate reaches 40% at post larval phase and 50% in the juvenile phase.

Introduction

Indonesia is a vast and rich country with biodiversity, including catfish. Catfish have many kinds, one of it is the Pearl Catfish (*Clarias ganriepinus*). Pearl sterine is a new breakthrough from the Badan Penelitian Pemuliaan Ikan (BPPI) Sukamandi through long research to select crosses of four catfish strains in Indonesia, namely the Egyptian catfish, Paiton catfish, Sangkuriang catfish and Dambo catfish. On 27 October 2014, the result of the four strains crosses were declared to have passed the release test under the name Pearl Catfish (*Clarias ganriepinus*) which was stipulated by Decree of the Minister of Maritime Affairs

and Fisheries Number 77/KEPMENKP/2015 (BPPI, 2014: Matasina & Tangguda, 2020) . Some of the advantages of the Pearl Catfish (*Clarias ganriepinus*) are relatively complete cultivation performance in terms of growth, size uniformity, feed efficiency, disease tolerance, stress, environment, and high productivity (BPPI, 2014: Matasina & Tangguda, 2020 & Wulansari et.al., 2022). Pearl Catfish (*Clarias ganriepinus*) is a freshwater consumption fish which is very popular and liked among Indonesian people which can be seen from various culinary fields, such as catfish pecel, catfish meatballs, catfish crackers, catfish fresh vegetables, and many more (Suminto et al., 2019).

Pearl Catfish (*Clarias ganriepinus*) is also one of the freshwater fishery commodities that has high marketing (Wulansari, et.al., 2022), it reach world market and production ranks 13th in the world. In addition, the percentage of catfish production is 2.3% worth 12,450,300 tonnes (FAO, 2020). The high production of catfish is supported by very high public consumption, because the price is affordable and it is easier to cultivate. As it is known that the price of consumption sized catfish ranges from Rp. 20,000.00 to Rp. 30,000.00 (KKP, 2020). From a national point of view, fisheries production contributes 10% with a growth rate of 17-18%. The maintenance of catfish can be shortened to 45-50 days in soil ponds from fish seeds measuring 5-7 cm or 7-9 cm (Suminto et al., 2019). However, in its growth, catfish need feed that contains of sufficient nutritional value and is more economical so that breeder can get more benefits, especially in the phases that are vulnerable to death, namely the post-larval and juvenile phases. Therefore, the researcher raised the title The Effectiveness of Utilizing Different Natural Foods on the Survival of Pearl Catfish (*Clarisa gariepinus*) in the Post Larvae and Juvenile Phases. This research aims to breeder to utilize natural feed more effectively so that the survival of the Pearl Catfish (*Clarisa gariepinus*) is higher than usual during the times of vulnerability to death.

Method

The type of this research used was descriptive qualitative. The objects of this research were catfish larvae in the post larval and juvenile phases. The natural food given was silk worms (*Tubifex* sp), fengli 0, and boiled egg yolks. The data collection techniques namely, the first was observation, that was testing with a specific purpose to collect facts, data, scores, and the value of a verbalization. The second was by interviewing, which was one of the most commonly used methods of collecting qualitative data which contains a number of questions addressed to respondents or informants related to the research topic being carried out to obtain appropriate information from trusted sources. The third was documentation, namely collecting, selecting, processing, and storing information in the field of knowledge. In addition, documentation is also interpreted as giving or collecting evidence and information as well as research evidence. The survival rate of the Pearl Catfish (*Clarisa gariepinus*) is calculated based on Effendi (1979) in Mewakani (2019) and Eriza et.al. (2022), with the formula as SR= Nt/Nox 100%. Where SR is the survival rate, Nt is the number of individuals at the end of the research, and No is the number of individuals at the start of the research. The data analysis in this research was carried out descriptively in describing the survival of the Pearl Catfish (*Clarisa gariepinus*).

Result and Discussion

The Effectiveness of Utilizing Different Natural Foods on the Survival of Pearl Catfish (Clarisa gariepinus) in the Post Larval Phase

According to the result of the giving natural foods which is different to Pearl catfish (*Clarias Garipinus*) survival in the Post Larval Phase (age 5-14 days) in Joko Pamungkas

Dusun Napar, Dasuk District, Sumenep Regency, East Java, in general, it can be said that the provision of natural food greatly influences to the effectiveness of the survival of the Pearl Catfish (*Clarias gariepinus*). Feeding silk worms (*Tubifex* sp) four times a day experienced good growth with the lowest mortality rate compared to fengli 0 and feeding boiled egg yolk, the result is 10%. This shows that the survival rate of the Pearl Catfish (*Clarias gariepinus*) is in the good category (figure 1). As for feeding fengli 0, the survival rate for Pearl Catfish (*Clarias gariepinus*) is quite good, because the death rate reaches 30% (figure 2) and on natural food, boiled egg yolk, the survival rate for Pearl Catfish (*Clarias gariepinus*) is not good, because the mortality rate up to 40% (figure 3). As shown in the following picture:

Figure 1 Pearl Catfish (*Clarias gariepinus*) with Silk Worm (*Tubifex* sp) Natural Feed

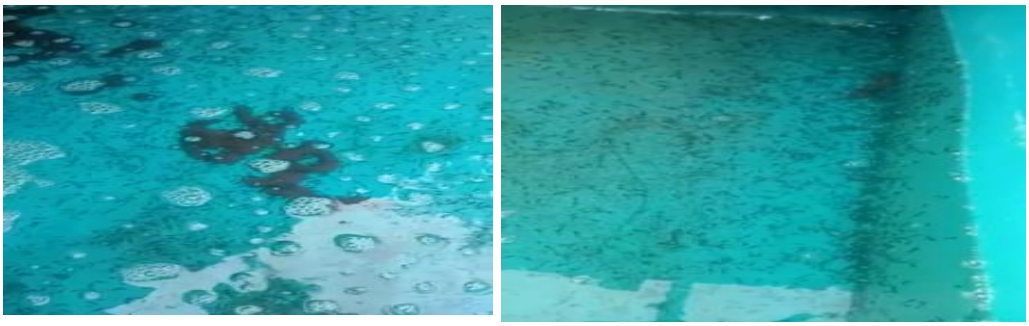

Figure 2 Pearl Catfish (*Clarias gariepinus*) with Fengli 0 Natural Feed

Figure 3 Pearl Catfish (*Clarias gariepinus*) with Boiled Egg Yolk Natural Feed

Based on the results of the study obtained, it can be concluded that the best natural food for the larvae of Pearl Catfish (*Clarias gariepinus*) is silk worms (*Tubifex* sp), because the mortality rate is the lowest. Silk worms are natural food which is highly nutritious and easily digested by fish larvae. As explained by Nuraini, et.al. (2019), namely at the beginning of life the larvae really need good quality food and timely feeding to be able to carry on their life, especially after the food reserves in the form of egg yolks have been used up. In this phase, foods that are easily digested and highly nutritious are needed, because the digestive tract and body organs have not developed properly. This is the key to success in fish farming, especially the Pearl Catfish (*Clarias gariepinus*). In the aquaculture business, the food have an important role for the growth and survival of fish and it will determine the success of the fish farming business. In the provision of feed must pay attention to several factors, including the amount and quality of feed related to the availability of food associated with the type and age. The more suitable the feed given to fish larvae in terms of size, quantity, and nutritional content, the more likely the larvae are to live and grow well. In addition, the availability of natural food that has a high nutritional content is an important factor in fish farming.

The nutritional content of silk worms (*Tubifex* sp.) includes 41.1% protein; fat 20.9%; and 1.3% crude fiber; and it has digestibility in the intestines of fish between 1.5-2 hours (Matasina, 2020). The nutritional content of Fengli 0 is 40% protein, 5% fat, 2% fiber, 13% ash and 10% moisture content. The nutritional content of boiled egg yolk includes 162 kcal

calories, 12.8 g protein, 11.5 g fat, and 0.7 g carbohydrates (Gunawan & Suraya, 2019). Nugraha (2020), explained that in selecting the fish feed ingredients need to consider the nutritional content of the foods so that the fish can grow well and the fish breeding requires ingredients in the form of protein, fat, carbohydrates, vitamins, minerals, and water. Protein in the fish feed is needed as the main source for growth, replacement of damaged cells, and maintenance of fish. Protein is needed by the young fish, because they are in the growth phase. Therefore, the Pearl Catfish (*Clarias gariepinus*) which is fed with silk worms (*Tubifex* sp.) has a higher survival rate, because the protein content is also high and its absorption is fast. However, the Pearl Catfish (*Clarias gariepinus*) which is fed egg yolks often leaves food behind, it makes thw cloudy water and a fishy smell in the water. This case makes the death rate of the Pearl Catfish (*Clarias gariepinus*) to be higher. The weakness of fengli 0 is the growth rate of the Pearl Catfish (*Clarias gariepinus*) is uneven, so that the larger Pearl Catfish (*Clarias gariepinus*) larvae will eat the small Pearl Catfish (*Clarias gariepinus*) larvae. This is the reason why the Pearl Catfish (*Clarias gariepinus*) fed fengli 0 has a mortality rate of 30%.

The higher the survival rate of the Pearl Catfish (*Clarias gariepinus*), the higher the profit for the breeder, so the breeder must pay attention to many things in the cultivation of the Pearl Catfish (*Clarias gariepinus*). One thing that must be considered is the nutritional level of the feed, water quality, and the duration of feeding every day, especially in the larval phase. This will make breeder successful in running their business.

The Effectiveness of Utilizing Different Natural Foods on the Survival of Pearl Catfish (*Clarisa gariepinus*) In the Juvenile Phase

The juvenile phase is the phase where the catfish is 15-21 days old, their movements are very active and their body shape are close to an adult fish, but their size are still small. but all the fins and scales have been fully formed and the bones have begun to harden and tend to form groups of similar size to avoid predators (Fauziyah, et.al., 2019). In this phase the survival rate of the Pearl Catfish (*Clarias gariepinus*) has started to improve, because their shape are close to an adult fish and their organs have gradually progressed towards perfection. However, feeding and water quality greatly affect the survival of the Pearl Catfish (*Clarias gariepinus*).

In this research, the survival rate of Pearl Catfish (*Clarias gariepinus*) fed silk worms (*Tubifex* sp.) Is in the good category, because the mortality rate only reached 10% (figure 4). As for the Pearl Catfish (*Clarias gariepinus*) which was fed fengli 0 the survival rate is quite good, because the mortality rate reached 30% (figure 5). However, the pearl catfish (*Clarias gariepinus*) which was fed boiled egg yolk has a poor survival rate because the mortality rate reaches 50% (figure 6). This is because there is a lot of leftover feed in the boiled egg yolk feed which makes the water quality worse. According to Wulansari (2022), Sumardiono (2020), Ridwantara (2019), & Robert et.al. (2019), water quality must be considered in catfish farming, even though catfish can still live in unfavorable environmental conditions, catfish still need appropriate or optimal water quality in order to grow optimally. Water quality is determined by variables, such as turbidity, color, temperature, pH, hardness, and the content of, ammonia, ionized, carbon dioxide, nitrite and nitrate. Based on some of these variables, temperature is a the important factor that need in the life of aquatic animals.

As for the Pearl Catfish (*Clarias gariepinus*) which was fed fengly 0 experiences uneven growth, so that the larger Pearl Catfish (*Clarias gariepinus*) could prey on the Pearl Catfish (*Clarias gariepinus*) which was smaller in size, because the Pearl Catfish (*Clarias gariepinus*) was cannibal animals as described by Muharam et.al. (2020) and Prasetya et.al. (2020), the obstacle found in catfish seed production activities is the high mortality due to the

cannibalistic habits of catfish. In feeding silk worms (*Tubifex* sp.), the survival rate of Pearl Catfish (*Clarias gariepinus*) is good, because silk worms (*Tubifex* sp.) Besides having high nutrition, silk worms are also a natural feed that are easily digested by the larvae of Pearl Catfish (*Clarias gariepinus*). As explained by Mandila and Hidajati (2013) in Febrianti et.al. (2020), Lastris (2020), and Umidayati (2021), that silk worms (*Tubifex* sp.) are natural food that are often used as fish feed. The nutritional content of silk worms (*Tubifex* sp.) consist of 13.3% fat, 57% protein, 2.04% crude fiber, 87.7% water, and 3.6% ash content. Silk worms (*Tubifex* sp.) contain 13 kinds of amino acids, namely 7 essential amino acids and 6 non-essential amino acids. Setiawati et al. (2014), in Mullah et.al. (2019), also explained that one of the example of natural food for catfish larvae is silk worms (*Tubifex* sp.). Silk worms (*Tubifex* sp.) are a type of natural food that are good for fish growth which have a high enough nutritional content and given live, so that silk worms are liked by fish and the silk worms are very easy to digest by the catfish.

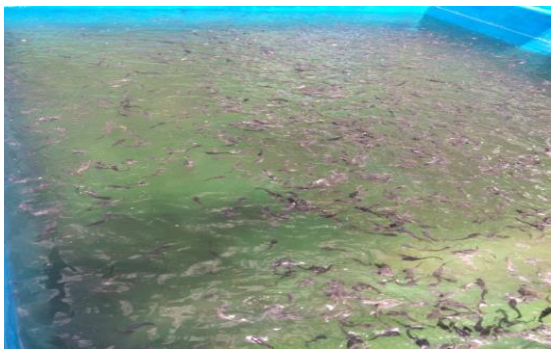

Figure 4 Pearl Catfish (*Clarias gariepinus*) with Silk Worm (*Tubifex* sp) Natural Feed

Figure 5 Pearl Catfish (*Clarias gariepinus*) with Fengli 0 Natural Feed

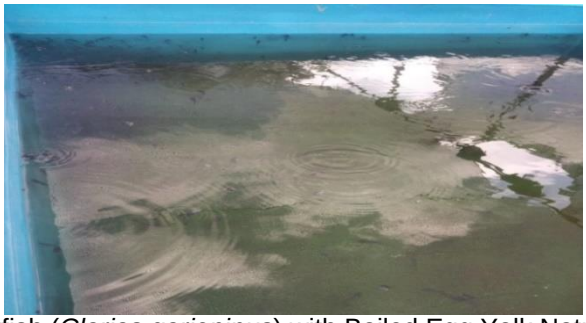

Figure 6 Pearl Catfish (*Clarias gariepinus*) with Boiled Egg Yolk Natural Feed

Conclusion

Feeding the Pearl Catfish (*Clarisa gariepinus*) with silk worms (*Tubifex* sp) are more effective than natural feed fengli 0 and boiled egg yolk, because silk worms have the highest nutrient content and fast digestibility. This can increase the breeder's income.

References

Eriza, M., Amelia S.L., M. Amri, Arlius, & Elfrida. (2022). Pengaruh Frekuensi Pemberian Pakan Berbeda Terhadap Kelangsungan Hidup dan Pertumbuhan Larva Ikan Asang (*Osteochilus Haselti* C.V). *Jurnal Agroqua. Vol. 20. No. 2*

FAO. 2020. The State of World Fisheries and Aquaculture (2020). Sustainability in action. Rome. *Fisheries and Aquaculture Department. ISSN 2410-5902*

Fauziyah, N., Kukuh N., Eddy S., & Yani H. (2019). Evaluasi Sistim Budidaya Lele: Aspek Produksi dan Strategi Pengembangannya (Studi Kasus: Pembudidaya Lele Kabupaten Tangerang). *Jurnal kebijakan Sosial Ekonomi Kelautan dan Perikanan Vol 9, No. 2 ISSN. 2089-6980*

Febrianti, S., Dadang S., & Eddy S. (2020). Budidaya Cacing Sutra (*Tubifex* sp.) dan Budidaya Ikan Lele Menggunakan Sistem Bioflok di Kecamatan Simpenan, Sukabumi. *Jurnal Pusat Inovasi Masyarakat. Vol 2 (3) 2020: 429–434. ISSN 2721-897X*

Gunawan, Irawadi & Ummi Suraya. (2019). Pengaruh Pemberian Pakan Tambahan Tepung Kiapu (*Pistia stratiotes*) dicampur dengan Pakan Komersil Terhadap Pertumbuhan Benih Ikan Lele Dumbo (Clarias gariepinus). *Jurnal Ilmu Hewani Tropika Vol 8. No. 1. ISSN : 2301-7783*

Kementrian Kelautan dan Perikanan. 2020. Laporan Kinerja (https://kkp.go.id/ancomponent/media/upload-gambar pendukung/LKJ%20KKP%202020%20Revisi%20(2)%20(1)) accessed, 16 July 2023 at 01.15 am

Lastris T. Molose. (2020). *Budidaya Cacing Sutra (Tubifex Sp) di Balai Perikanan Budidaya Air Tawar (BPBAT) Tatelu*. Manado

Matasania, S.Z. & Sartika Tangguda. (2020). Pertumbuhan Benih Lele Mutiara (*Clarias gariepenus*) di PT. Indosco Dwi Jaya (Farm Fish Booster Centre) Sidoarjo, Jawa Timur. *Jurnal Akuakultur Rawa Indonesia, 8 (2): 123 – 128. ISSN : 2303-2960*

Mewakani, Sugiharti & Herlina Pasaribu. (2019). Respon Pertumbuhan Benih Lele Sangkuriang (*Clarias* sp.) Akibat Penambahan Probiotik Pada Pakan Komersil dengan Dosis yang Berbeda. *Jurnal Perikanan dan Kelautan. Vol. 1. No. 1*

Muharam, Rizki M., Soelistyowati, Dinar T. A., & Harton. (2020). Pengendalian Kanibalisme Pada Benih Ikan Lele (*Clarias* Sp.) dengan Penambahan Tepung Kedelai dalam Pakan. (https://repository.ipb.ac.id/handle/123456789/112771). accessed, 16 July 2023 at 02.33 am

Mullah, A., Nanda D., & Baiq H.A. 2019. Pengaruh Penambahan Cacing Sutra (*Tubifex*) Sebagai Kombinasi Pakan Buatan Terhadap Efisiensi Pemanfaatan Pakan dan Pertumbuhan Larva Ikan Lele Sangkuriang (*Clarias gariepinus*). *Jurnal Perikanan, Volume 9. No. 2 : 160-171*

Nugraga, E.N. 2020. Pengaruh Pakan Buatan Terhadap Pertumbuhan Benih *Clarias gariepinus* di Kelompok Budidaya Ikan Manunggal Jaya. *Jurnal Pendidikan Fisika dan Sains (JPFS) 3 (2) (2020) 59-67*

Nuraini, Nasution, S., Afrizal Tanjung, & Henny Syawal. 2019. Budidaya Cacing Sutra (*Tubifek* Sp) Sebagai Makanan Larva Ikan. *Volume 1, Issue 1. ISSN :2715-9566*

Prasetya, O.E.S., Muarif, & Fia S,M. 2020. Pengaruh Pemberian Pakan Cacing Sutra (*Tubifex* sp.) dan *Daphnia* sp. Terhadap Pertumbuhan dan Tingkat Kelangsungan Hidup Larva Ikan Lele Sangkuriang (*Clarias gariepinus*). *Jurnal Mina Sains ISSN: 2407-9030 Volume 6 Nomor 1*

Ridwantara, D., Buwono, I. D., & S. , A. A. 2019. Uji Kelangsungan Hidup dan Pertumbuhan Benih Ikan Mas Mantap (*Cyprinus carpio*) Pada Rentang Suhu yang Berbeda. *Jurnal Perikanan dan Kelautan, 10 (1) : 46-54*

Robert, S., Daud, K., Wilfred, K., & Joshua, V. 2019. Interactive Effect Of Water Temperature And Nitrate Fertilizers On Growth, Survival, And Hatching Success Of Eggs, Embryos And Larvae Of African Catfish (Clarias Gariepinus, Burchell 1822). *Journal of AquacultureEngineering and Fisheries Research, 5(2), 27-27*

Sumardiono, A., Rahmat, S., Alimudin, E., & Illahi, N. A. 2020. Sistem Kontrol-Monitoring Suhu dan Kadar Oksigen Pada Kolam Budidaya Ikan Lele. JTERA. *Jurnal Teknologi Rekayasa), 5 (2) : 231-236*

Suminto, Tititk S., Sarjito, & Diana C. 2019. Produksi Pembenihan Lele Dumbo (*Clarias gariepinus*) Strain Mutiara dan Payton dengan Pakan Alami Cacing Sutera dari Kultur yang Memanfaatkan Limbah Pertanian. *Sains Akuakultur Tropis: Indonesian Journal of Tropical Aquaculture, vol. 3, no. 1, pp. 47-55*

Umidayati. 2021. Penggunaan Fermentasi dengan Bahan Hewan dan Sayuran Sebagai Bahan Media Budidaya Cacing Sutra (*Tubifex* Sp*). Jurnal Sains Akuakultul Tropis :5(2021)2: 179 – 189. eISSN:2621-0525*

Wulansari, K., Abdul razak, & Vauziah. 2022. Pengaruh Suhu Terhadap Pertumbuhan Ikan Lele Sangkuriang (*Clarias Gariepinus*) dan Ikan Lele Dumbo (Clarias gariepinus x Clarias fiscus). *Konservasi Hayati, 18 (1): 31-39* p-ISSN: 0216-9487