

Breeding Stage of Nemo Balong Fish (*Premnas biaculeatus*) on Aquarium Scale at Balai Perikanan Budidaya Laut Lombok

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ABSTRACT

Nemo fish cultivation activities at BPBL (Balai Perikanan Budidaya Laut) is located in West Sekotong, West Lombok Regency, West Nusa Tenggara. It is one of the technical implementation units for marine aquaculture in developing marine fish farming activities such as ornamental nemo or clown fish. The purpose of this activity is to determine the spawning of nemo fish carried out on an aquarium scale. Clown fish spawning activity at BPBL Lombok produces up to 1,050 eggs in a period, but the average fertilized is 1,012 eggs, and the hatching numbers are 884 eggs during 6 days of incubation and the time needed to start hatching is 24 hours. Some of the parameters of larval growth from eggs, namely FR / Fertilization Rate, get a result of 96%, HR (Hatching Rate) gets a value of 87%, SR (Survival Rate) with a value of 92%. Water quality such as the ideal temperature in nemo fish cultivation is in the range of 27-32°C, while the ideal pH is 6.7-8.8. Dissolved oxygen is more than 5 mg/L. The salinity and ammonia content obtained are ideal, which showing value 30-34 ppt for salinity and ammonia levels less than 3 mg/L.

INTRODUCTION

Indonesia is known as a country with enormous marine wealth, this biodiversity being a world tourism highlight that provides its own charm. Indonesia's strategic location makes its aquatic resources develop rapidly and excel with its diverse life and one of the fishery and marine water resources in tropical areas is ornamental fish that live side by side with coral reefs (Staniria *et al.*, 2023).

One of the ornamental fish commodities that can be traded both domestically and abroad is nemo fish or known as *clownfish*. Based on data from BSN (Badan Standardisasi Nasional) in 2020, ornamental fish exports in Indonesia have started to increase significantly since 2012, one of the species is nemo fish as superior ornamental fish with high economic value (Kilmanun *et al.*, 2024). Therefore, nemo fish cultivation activities are needed as a solution to prevent extinction in their natural habitat.

The nemo fish cultivation activity itself is located at BPBL (Balai Perikanan Budidaya Laut) Lombok is located in Dusun Gili Genting, West Sekotong, West Lombok Regency, West Nusa Tenggara. BPBL Lombok is one of the technical implementation units for marine

aquaculture in developing marine fish farming activities such as nemo fish. Therefore, the author chose the location at BPBL regarding the breeding of clownfish (*Premnas biaculeatus*).

METHODS

This activities is carried out for 30 days. The implementation began on Monday, March 4th to Thursday, April 4th 2024 at BPBL (Balai Perikanan Budidaya Laut) Lombok, West Sekotong, West Nusa Tenggara. The tools and materials used can be seen in Tables 1.

Table 1. Tools and Materials




No.	Tools	Materials
1.	Aquarium	Sea water
2.	Fiber tank	Fresh water
3.	Beaker glass (100 ml)	Arthemias
4.	Plastic bucket (5 l, 20 l, 100 l)	Marine sand worms
5.	Water filter	Squid
6.	Cylinder basket	Clownfish
7.	Sorting basket	Omega 3 Fish Oil
8.	Dipper	<i>Nannochloropsis</i> sp
9.	Aerator	Kaio love larvae pellets 6
10.	Plankton net	Kaio love larvae pellets 1
11.	Plankton net filter	Rotifer
12.	Plankton hose	Soap
13.	Hose & aeration stone	Snapper fish eggs
14.	Siphon hose	Shrimp
15.	Spoon	Vit E
16.	Brush	
17.	Sponge	

The method used is primary and secondary data collection techniques. Primary data, namely collecting data through observation, interviews, active participation, documentation. Meanwhile, secondary data is from sources that can be used, such as books, journals, articles and so on, as supporting data for the implementation of field work practice activities. The data analysis used was by monitoring the growth of larvae, such as determining the growth length of the larvae, egg fertilization (FR/Fertilization Rate), egg hatching (HR/Hatching Rate), SR/Survival Rate, feed management and water quality management, to harvesting seed.

RESULTS

The growth of larvae is monitored every week by sampling to determine the length measurement, until it is ready for the seed harvest phase. In the nemo fish, the type of Balong has a tendency to grow faster because it has a genetic tendency for a large body size compared to other species of nemo fish. The growth of nemo fish larvae from length measurements can be seen in Table 2.

Table 2. Growth in Length of Nemo Fish Larvae

Time	Length (cm)	Picture
Week 1	0.5	
Week 2	0.7	
Week 3	1	

The results of egg fertilization (FR/Fertilization Rate), HR/Hatching Rate, SR/ Survival Rate can be seen in Table 3.

Table 3. Results of FR, HR, SR

Parameter	Results (%)
FR (Fertilization Rate)	96
HR (Hatching Rate)	87
SR (Survival Rate)	92

The results of water quality during the maintenance of nemo fish larvae obtained from the results of the health and environmental laboratory can be seen in Table 4.

Table 4. Water Quality Parameters for Maintaining Nemo Fish Larvae

No.	Parameters	Results	Quality standards
1.	Temperature (°C)	28	27-32
2.	Salinity (ppt)	32	30-34
3.	pH	8.1	6.7-8.8
4.	Ammonia (mg/L)	0.00	<0.3
5.	DO (mg/L)	5	>5

DISCUSSION

Media Preparation

The maintenance media for prospective spawning fish are the same in the form of an aquarium with a volume of 60 L filled with water to a height of 50 cm, there are 16 units of spawning aquariums and 16 units of maintenance aquariums for prospective breeding, and there are 5 units of fiber tanks with a volume of 816 L in the location of the Nemo fish hatchery, with a continuous flow of water to produce oxygen. The preparations that need to be

considered in fish breeding activities are as follows:

- a. Washing the parent aquarium and prospective breeding. The aquarium is cleaned from moss using a sponge and wire without using soap then rinsed with fresh water to make it sterile again from bacteria or fungi that are saline, as well as in the spawning container by brushing the egg substrate to stick.
- b. Equipment Cleaning. The equipment used in seeding activities is very important to be considered by sterilizing it using fresh water. According to Arduino *et al.* (2018), which states that by paying attention to the balance of environmental conditions for ornamental fish maintenance, death can be prevented.
- c. Water Filling. Water filling is carried out into the spawning container until it reaches 60 L for each aquarium slowly so as not to carry a lot of dirt even though it has been filtered. The purpose of the water filter itself is to filter water from dirt. According to Wahbi *et al.*, (2022) who stated that water filtration is the process of filtering water that contains dirt and makes it suitable for use.
- d. Preparation of Larvae Maintenance Tank. Hatching activities of nemo fish eggs is done by brushing the container until it is clean and rinsing it using fresh water and then be dried. After the fiber tank has dried, filtered seawater is poured in until the height reaches 30-40 cm or 680 L, then *Nannochloropsis* sp. is added.

Breeding Selection

The selection of broodstock aims to produce quality and superior seeds, thus the selection of prospective broodstock is carried out by knowing several criteria. Based on several types of nemo fish, they have varying growth but are good in size, age and reproduction, one of which is the Balong species which has a fast growth and reproduction rate. This is in line with Junaidi (2020) who stated that prospective broodstock are obtained from nature and it is necessary to pay attention to the selection of prospective broodstock based on species, age and growth, and resistance to disease.

According to Fahrurrazi & Fitriasaki (2022), genetic selection is a breeding process to improve genetic composition of prospective parents used as superior seed producers and become productive parents. Some of the characteristics of quality parents are no defects, the parents are of clear origin, do not carry diseases, fast growth and quality genetics. The nemo balong fish maintained at BPBL Lombok were successfully cultivated from the results of domestication, which were then paired to become parents ready to spawn. Before the selection, the fish must have a size of 6-7 cm, then 8-12 cm are entered to get a pair. This is in accordance with the opinion of Junaidi (2020) who stated that the size of the prospective nemo fish parent has a body length of 5-7 cm with the female body shape tending to be larger than the male.

The pairing of potential broodstock is carried out for 2-4 weeks by paying attention to the behavior of the fish swimming alongside each other. This is in line with the opinion of Adamimawar *et al.*, (2019) which states that the prospective parents that have been paired based on small and large sizes are kept for 6 months, before entering the spawning period.

Spawning and Egg Handling

a. Spawning Process

Spawning activities at BPBL Lombok are carried out in a natural aquarium measuring 40 x 30 x 60 cm which has been cleaned and placed with tiles as a substrate for the nemo fish eggs to stick to. The characteristics of male nemo balong broodstock are that they have a

predominantly smaller body with a size of 6-7 cm, while females have a relatively larger size, namely 10-15 cm than male nemo balong fish. In addition, it can be seen from the female's stomach which is predominantly bloated and the male is rather slim. This is in accordance with Junaidi (2020) who stated that visually it can be seen that males are smaller and slimmer than females who have bloated stomachs.

The behavior in the spawning process is that the male parent will clean the substrate as a place for the eggs to stick, then will attract the attention of the female with a broken movement like swinging towards the female parent. Furthermore, both parents will be more active in the spawning process. This is in line with the opinion of Junaidi (2020) who stated that the behavior of a pair of nemo fish parents will be like chasing each other by swimming side by side and often visiting their nest to be cleaned by biting the substrate as an activity to prepare for egg attachment, the parents also move to touch each other's stomachs. The nemo fish spawning activity can be seen in Figure 1.



Figure 1. Spawning of Clownfish (*Premnas biaculeatus*)
(Source: Personal Documentation, 2024)

The ratio of nemo fish parents in spawning activities is 1:1 (Chairani, 2019). In general, they can spawn 3-4 times a month, and in one spawning they can produce up to 1,813 eggs which are incubated for 7 days. The parents start laying eggs from the afternoon and evening. Spawning at BPBL Lombok produces up to 1,050 eggs in one spawning, but the average that is fertilized is 1,012 eggs, and the number that hatches is 884 eggs during 6 days of incubation and the time needed to start hatching is 24 hours.

b. Egg Handling

Nemo fish eggs have adhesive properties or stick to the substrate and eggs can stick to each other to form clumps (Larasati et al., 2017). Nemo fish eggs will change color after being successfully fertilized until the hatching period arrives, starting from the first day to 6-7 days of egg age with signs of shiny larval eyes when flashed and predominantly black.

In the egg hatching process, it is generally carried out at the age of 7 days, preparation of a fiber tub as a place to maintain larvae containing natural food of *the Nannochloropsis* sp. type as much as 20 L for a water volume of 680 L and a cylindrical basket is inserted as a place for the egg substrate and parents during hatching which lasts 24-48 hours with aeration always on, but generally hatches 24 hours. Transfer of eggs and parents in the morning or evening. This is in accordance with the opinion of Junaidi (2020) who stated that the larvae to be harvested or hatched were previously filled with seawater in a fiber tub and natural food in the form of phytoplankton, *Rotifer*, *Artemia* and pellets was spread. After the eggs hatch, the parents are returned to the aquarium with their substrate to spawn again, usually it takes 7 days after laying eggs for the fish to spawn.

c. Larvae Growth

The growth of larvae is monitored every week by sampling to determine the length

measurement, until it is ready for the seed harvest phase. In the nemo fish, the type of Balong has a tendency to grow faster because it has a genetic tendency for a large body size compared to other species of nemo fish.

d. FR (Fertilization Rate)

FR/ Fertilization Rate which is the number of eggs that were successfully fertilized from the total number of nemo eggs that were counted manually got a result of 96% of the total number of eggs 1,050, fertilized 1,012 eggs. Based on the results of the spawning, the number of fertilized eggs is large and there are several supporting factors both from outside and from inside.

e. HR (Hatching Rate)

HR / Hatching rate or egg hatching power is the number of eggs that successfully hatch into larvae. In nemo fish eggs, it can be known from the number of larvae that hatch by taking an average sample and dividing it by the number of fertilized eggs to get a value of 87%. The results of the high hatching power of eggs during spawning are influenced by the appropriate substrate. to attach eggs during hatching (Oktavianti *et al.*, 2021)

f. SR (Survival Rate)

SR / Survival Rate in nemo balong larvae is quite high from the number of hatched 884 to 816 after 1 week of sampling with a value of 92%. In nemo balong fish it is higher when compared to nemo *Ocellaris*, Biak and Giro fish, because it is based on the genetics of the species itself. This is in line with the statement of Nor *et al.*, (2023) which states that there are two factors that influence the survival rate of fish, namely internal factors in the form of genetics or the advantages of the seeds themselves and external factors such as environmental conditions or in handling fish.

Feeding

Feeding is done 3 times a day, namely morning (08:00), afternoon (11:00) and evening (15:00), which is done by Ad satiation or feeding until the fish start to feel full with (FR/ *Feeding Rate*) 3%. The types of food for Nemo fish can be seen in Figure 2.

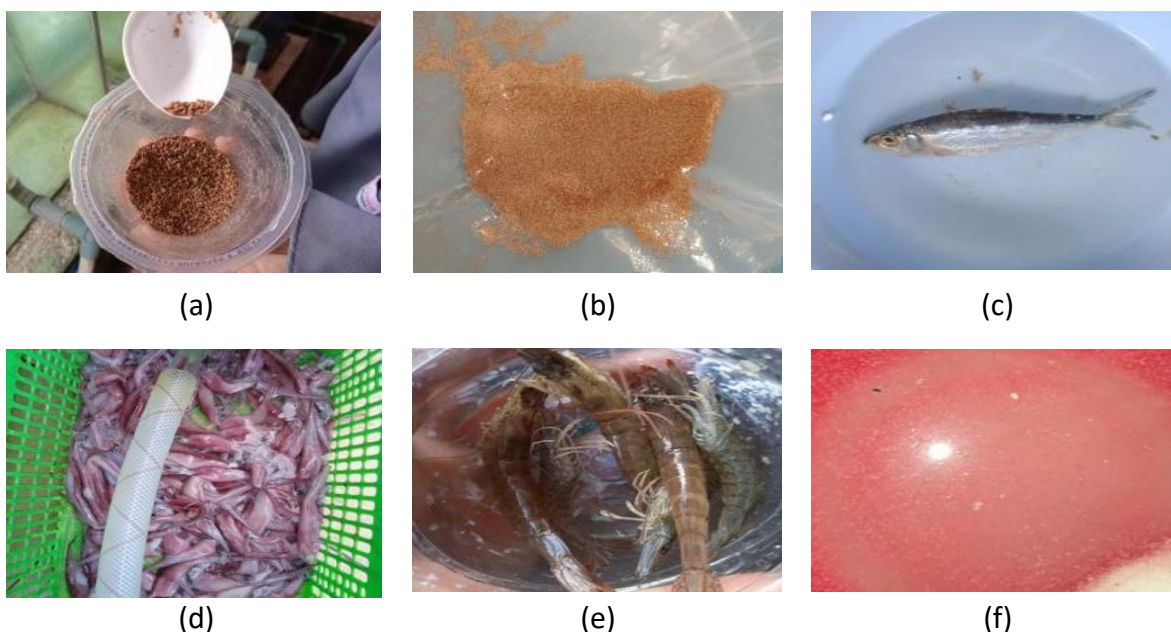


Figure 2. (a) Kaio Pellets No. 6; (b) *Artemia*; (c) Trash Fish (d) Squid; (e) Shrimp; (f) Snapper Eggs (Source: Personal documentation, 2024)

Water Health and Quality Management

Water change and siphon. Water changes in the larval tank and parent aquarium are carried out to maintain clean water quality up to 30-70% of the water volume. Treatment the disease that attacks is often a fungal infection due to a weak immune system in conditions where bacteria attack nemo fish, both parents, prospective parents and seeds. Nemo fish are often attacked by *Cryptocaryon irritation* which can cause mass death of up to 100%, usually marked by a pale body color. Treatment according to Yunarty *et al.* (2023) which states that treatment can use fresh water for fish that are sick by soaking them for approximately 5 minutes. The sample of nemo fish that are attacked by disease can be seen in Figure 3.



Figure 3. Nemo Fish Infected with *Cryptocaryon irritans* disease
(Source: Personal documentation, 2024)

Water quality in controlled larval maintenance is also carried out during maintenance such as temperature, salinity, dissolved oxygen, ammonia, pH. Temperature is one of the main factors that easily affects larval activity such as appetite and is related to dissolved oxygen content, as well as ammonia which if high will cause death. The ideal temperature for nemo fish cultivation is in the range of 27-32°C, while the ideal pH is 6.7-8.8. Dissolved oxygen is more than 5 mg/L (Oktavianti *et al.*, 2021). Meanwhile, the salinity and ammonia content obtained are ideal. This is in line with the statement of Setiaji & Johan (2015) which states that good salinity during nemo fish maintenance is 30-34 ppt and ammonia levels are <3 mg/L. If ammonia is high, it will experience poisoning or mass death in farmed fish.

CONCLUSION

Based on this activity in the Nemo Balong fish hatchery, there are several stages that need to be carried out, starting from matching and selecting prospective nemo fish parents, natural spawning techniques, handling the maintenance of eggs until they become fry. Feeding on larvae in the form of phytoplankton, zooplankton and pellets, with a frequency of administration of 3 times/day. In maintaining the health of nemo fish during larval maintenance, it is necessary to pay attention to water quality and handling due to disease attacks that occur during maintenance until harvest.

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