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Feeding Management Of Super Intensive Tilapia Fish (*Oreochromis niloticus*) Culture

Manajemen Pemberian Pakan Pada Kegiatan Budidaya Ikan Nila Nirwana (*Oreochromis Niloticus*) Super Intensif

Muhammad Rifki Alhijrah[1*], Andre Rachmat Scabra[2]

Aquaculture Department, Mataram University

Pendidikan Sreet - Dasan Agung Baru, Selaparang District, Mataram City, West Nusa Tenggara

*Coresponding author : andrescabra@unram.ac.id

ABSTRACT

Tilapia is a commodity that has a high selling value. The demand for tilapia from year to year continues to increase, because this fish is popular and is also considered to be aquatic chicken, even this has been known as aquatic turkey. This Field Work Practice aims to find out the Management of Super Intensive Nila Tilapia (*Oreochromis niloticus*) Feeding in Tambak Teratak Village, North Batukliang District, Central Lombok Regency. This street vendor activity was carried out from 15 July 2021 to 14 August 2021 in the ponds of Teratak Village, North Batukliang District, Central Lombok Regency. Data collection methods used are active participation, observation, and interviews. Data analysis used is descriptive analysis. This activity starts from pond preparation, media preparation, seed preparation, steroid application, herbs and probiotics, as well as water quality management. Management of Nirvana tilapia seed feed was given 3 times a day with 412 grams of feed for 21 days with feed mixed with steroid to masculinize or change the sex of tilapia from female to male. After 21 days, the fish fry were given a mixture of probiotics and herbs as much as 1.5 kg of feed for 11 seed pond plots. The stocking density per seed pond plot was 140,000 individuals, of the total stocking density, the number of fish that managed to reach nursery or grow-out was 110,000 individuals. The length of tilapia from the beginning of maintenance to 1 month of rearing is 2-3.5 cm. Quality management is carried out by adding probiotics, herbs and molasses 3 times a day according to weather conditions.

ABSTRAK

Ikan nila adalah satu komoditas yang mempunyai nilai ekonomis yang tinggi. Permintaan akan ikan nila berdasarkan tahun ke tahun terus mengalami peningkatan, lantaran ikan ini digemari dan dianggap pula menjadi aquatic chicken bahkan ini sudah

dikenal menjadi aquatic turkey. Kegiatan ilmiah ini bertujuan untuk mengetahui Manajemen Pemberian Pakan Benih Ikan Nila Nirwana (*Oreochromis niloticus*) Super Intensif Di Tambak Desa Teratak, Kecamatan Batukliang Utara, Kabupaten Lombok Tengah. Metode pengumpulan data yang digunakan yaitu partisipasi aktif, observasi, dan wawancara. Data yang diperoleh selama kegiatan dianalisis secara deskriptif. Kegiatan ini dimulai dari persiapan kolam, persiapan media, persiapan benih, pengaplikasian bahan steroid, herbal dan probiotik, serta pengelolaan kualitas air. Manajemen pakan benih ikan nila nirwana diberikan sebanyak 3 kali sehari dengan pakan sebanyak 412 gram selama 21 hari dengan pakan yang dicampurkan dengan bahan steroid untuk maskuinisasi atau pengarahan kelamin ikan nila dari betina ke jantan. Setelah melewati 21 hari benih ikan diberikan pakan campuran probiotik dan herbal sebanyak 1,5 kg pakan untuk 11 petak kolam benih. Padat tebar per petak kolam benih yaitu 140.000 ekor, dari jumlah padat tebar tersebut jumlah ikan yang berhasil sampai pendederan atau pembesaran yaitu sebanyak 110.000 ekor. Panjang ikan nila dari awal pemeliharaan sampai 1 bulan pemeliharaan yaitu 2-3,5 cm. Pengelolaan kualitas dilakukan dengan penambahan probiotik, herbal dan molase sebanyak 3 kali sehari sesuai dengan keadaan cuaca.

Kata Kunci	*Ikan nila nirwana, manajemen pakan, pemeliharaan, persiapan pemeliharaan, pertumbuhan*
Keywords	*Tilapia nirvana, feed management, rearing, rearing preparation, growth*
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INTRODUCTION

One type of freshwater fish that is currently widely cultivated is tilapia (*Oreochromis niloticus*) because it is in great demand by the public. The development of tilapia cultivation is widespread in various countries, such as Thailand, Vietnam and Indonesia (Rukmana, 1997 in Amalia et al., 2018).

The advantages of tilapia fish are that it has a specific taste, dense flesh, is easy to serve, does not have many spines, is easy to obtain and the price is relatively cheap (Yans, 2005 in Nurhatijah et al., 2022). Tilapia fish meat contains 17.5% protein, 4.7% fat and 74.8% water. The total production of tilapia in the world in 2015 reached 5,576,800 mt where Indonesia was the 2nd largest supplier of tilapia in the world after China, with a total production of 1,100,000 mt (FAO, 2016 in Robisalmi et al., 2020).

It is hoped that the development of tilapia cultivation in fresh waters will be able to increase the source of tilapia production as a source of protein for the community while also being able to utilize unproductive land. The price of tilapia fish on the market or in cultivation places can be obtained for IDR 25,000 to IDR 30,000. The selling price is still considered affordable for the public. Tilapia cultivation also aims to meet increasing demand.

The success of fish farming depends on providing feed in quantities appropriate to

the fish's needs. Feed is one of the elements that influences the development of cultivated fish. Good quality feed is one of the key elements that determines the success of fish farming. The best way to save feed costs is to use feed effectively by choosing the type, quantity and frequency of feed that suits the needs and eating habits of the fish commodities being cultivated (Fradina & Latuconsina, 2022). Therefore, when cultivating tilapia, it is necessary to pay more attention to feeding management to support the growth and survival of the cultivated tilapia.

Even though tilapia is a commodity that is easy to cultivate, there are several factors that can hinder the success of tilapia cultivation, such as the quality and quantity of feed provided. Feed that has good quality, such as protein content according to the fish's needs, will support good and fast fish growth, and the quantity of feed, such as the amount of feed given and the frequency of feeding, must be measured according to the age and size of the fish being farmed. Therefore, this activity is very important to carry out in order to find out good feeding management in super intensive cultivation of nirvana tilapia (Oreochromis niloticus). It is hoped that this scientific activity can provide information on super intensive tilapia cultivation activities, especially on feeding management activities.

METHODS

This scientific activity was carried out from 15 July 2021 to 14 August 2021 at the tilapia fish pond, Teratak Village, North Batukliang District, Central Lombok Regency. The method used in this activity is descriptive and participatory methods. The types of data used in writing this scientific work are secondary data and primary data. Primary data in this scientific study was obtained from observation, interviews and active participation. Observation is by observing, carrying out and documenting all seed maintenance activities, especially the management of feeding Nirvana tilapia seeds. Interviews were conducted by means of questions and answers regarding all seed maintenance activities starting from media preparation, seed feeding management and obstacles or problems encountered during seed maintenance. Active participation in this scientific activity is carried out by directly following the activities at the Nirvana tilapia fish cultivator starting from pond preparation, media preparation, seed preparation, application of steroids, herbs and probiotics, as well as water quality management. Secondary data in this scientific field are documents from agencies and several journal literature and previous research which are used as comparisons with data obtained during scientific activities..

RESULT AND DISCUSSION

Nirvana tilapia seed pond

Land preparation is the earliest activity carried out in Nirvana tilapia cultivation activities. Land preparation must be carried out properly and follow the procedures that have been determined in the pond. Because this is an aspect that is said to have a big influence on the cultivation stage of Nirvana tilapia seeds. Land preparation activities include draining the pond, cleaning the pond, liming the pond, installing pond outlets, filling water, and water treatment.

Figure 1. Seed rearing pond

The cultivation ponds used by cultivators are ponds using a super intensive system. Pools with a super intensive system are pools with high density and use concrete pools covered with tarpaulin *Hight Densitry Polyethilene* (HDPE).

Pool draining and cleaning

Drying the pool is the first step in preparing the pool. Drying is done by opening the outlet located at the end of the pool. After the water in the pool has been drained, the pool is cleaned by directing dirt from the inlet end to the outlet using clean water with a bucket or spray from a water pump and brushing the walls of the pool so that moss or dirt doesn't stick to it, leaving it exposed to sunlight for one to two days so that the gas - Toxic gas evaporates and does not poison fish seeds during rearing. This is in accordance with Ismail's (2016) statement that pool cleaning is carried out until the pool is completely dry and rinsed with clean water. This is intended to eradicate pests and diseases that are still attached to the bottom of the pool and pool walls.

Figure 2. Pool draining and cleaning

Liming the pool

The lime used is dolomite lime with a frequency of 2.5 kg for one pond plot. Liming is done by dissolving 2.5kg of lime with water in a bucket then stirring. Then spread it in the pool using a ladle both in the middle of the pool and on the walls of the pool and then leave it for 1 full day. The function of liming itself is to eliminate pests, increase pH, add

calcium and magnesium elements. This is in accordance with the statement of Ummari et al. (2017) Liming ponds is a way to overcome decreasing pH levels in waters. Dolomite lime is lime which is commonly used in agriculture to reduce soil acid levels and add calcium and magnesium elements to ponds during maintenance.

Figure 3. Weighing and Dissolving lime

Installation of outlet pipe

Install a 4 inch outlet pipe, then connect the top part with a shorter pipe that has been fitted with a net. This is done when filling, so that the water does not exceed the predetermined height limit and the fish are not carried away by the water.

Filling and preparing maintenance media

Water filling is carried out for 1-2 days with a 1 inch pipe and the water comes from the river which is sucked using a summersible pump which can transport water from a height of 6 meters. Water filling is carried out to a height of 50-60 cm.

Table 1. Frequency of administration of the probiotic mixture

No	Solution	Dose
1	POC	50-100ml/m^3
2	POK	100ml/m^3
3	Molase	20ml/m^3

Farmers cultivate fish using a biofloc system where this system helps in growing natural food in the rearing media as well as regulating water quality when rearing tilapia fry. Preparations are made so that natural food can grow in the pond waters, including additional food for fish seeds. The formulations used are probiotics, POK and molasses. The solution is mixed thoroughly according to the specified dosage. The doses given are probiotics (POC) 50-100ml/m3, molasses 20ml/m3 and POK 100ml/m3. The solution is made from ingredients that are good for waters such as molasses, SP36, ZA, tape yeast, lactoba powder, and probak which are mixed in a 200 liter drum with the dosage of each ingredient having been determined. This solution is given the day before the fish seeds are stocked every 3 days depending on weather conditions. In accordance with the statement by Panggabean et al. (2016) the microbes or bacteria in liquid biological fertilizer are Bacillus sp. This bacteria is a type of aerobic bacteria that can be found in nature and is also produced commercially and is effective as a biological agent in processing organic waste in waters.

Figure 4. Probiotic Distribution

Seed preparation

Seed preparation is carried out by taking seeds from the parent pond that have already spawned using a net. Then the net is placed in one corner of the pool. The fish seeds are first sorted in the net using a scoop. The fish that can come out of the scoop holes are fish seeds measuring 1 cm. The fish seeds are put into a drum filled with water mixed with methylene blue to anticipate wound infections due to networking on the fish's body parts. The fish seeds are then spread, submerging half of the drum and letting the fish seeds come out by themselves. The density of one pond plot is 140,000 seeds.

Figure 5. Seed collection and sorting

The application of steroid materials is applied during the masculinization process using the oral method. The dose used is 30mg/kg. The steroid material in solid state is

melted using 95% alcohol, then weighed 3 grams for 1kg of feed. Then dissolve the steroid ingredients using 10 ml of 70% alcohol. The solution is put into a sparay container then sprayed on the flour feed and spread evenly. This feed is made in 10 kg with a usage period of 8 days. This was stated by Mangaro et al. (2018) masculinized tilapia fish up to 100 percent by providing feed mixed with 50 mg/kg of 17α steroid hormones. Soaking the steroid material is carried out at a dose of 10 mg/ltr, before the hormone treatment is carried out it needs to be diluted with 70 percent alcohol.

The application of herbs and probiotics to feed is carried out after the fish seeds have passed monosex. The use of herbs and probiotics at a dose of 20ml/kg feed aims to increase the fish's appetite and be digested well and no less important is the use of herbs and probiotics aimed at increasing the fish's immunity to extreme weather and the waste produced is not harmful to the environment. Even the waste produced when excreted through the outlet is useful for the surrounding plants. Hadi & Wijaya (2012) in Harmilia et al., (2019) stated that the weight growth of milkfish was more optimal in the treatment of adding EM-4 probiotics and showed a more significant effect than just adding vitamins to the feed. The addition of probiotics to snakehead fish seed feed did not have a significant effect on absolute length growth, but had a significant effect on absolute weight growth.

Maintenance

Rearing of 1cm seeds in super intensive rectangular ponds with a size of 23 m3 in 11 ponds with a density per pond plot of 140,000 seeds. In this pond, fish seeds must go through a monosex process for 21 days before being moved to the next nursery. The monosex process is carried out using an oral system where special feed is given. This process is carried out to obtain male fish because male fish grow faster than females. After passing monosex, they will be given flour with a mixture of herbs. This is in accordance with the statement of Mangaro et.al (2018) Cultivation using single sex fish rearing is the selection of only male tilapia fish to be reared because they grow faster and are larger in size than female tilapia. The application of sex reversal for masculinization in fish seeds can be done using synthetic steroid hormones orally (through feed), immersion (embryonic, larval or parent stages) and injecting fish.

Figure 6. Size of Tilapia fry at the beginning and end of rearing

Maintenance

The first thing that is done when raising tilapia fry is feed management, namely feed selection. The feed used must have high protein and contain ingredients that can support the growth and survival of the seeds. Then a feed mixing formulation using probiotics and herbs is used so that the feed given can be optimal and digested well and does not become dangerous waste for waters that affects water quality. The way to manage feeding is by knowing the type of feed, time and frequency of administration, as well as the application of steroid, herbal and probiotic ingredients as artificial feed mixtures.

The type of artificial feed used by farmers is feed that contains protein. By paying attention to the content in the feed, it has a great influence on fish growth.

Table 3. Feed type content

Feed code	Protein	Brand
-0	38%	STP PV shrimp feed

The artificial feed used is shrimp flour feed (-0) with a protein content of 38% which is quite high as a support for the growth of tilapia fry. This was stated by Noviana et al. (2014) The growth that occurs in tilapia is largely determined by the quality and quantity of feed. Efficient use of nutrients in feed is a crucial factor in increasing growth. At the seed stage, tilapia requires feed that has a high protein content. According to Ghufran & Kordi (2007) in Noviana et al., (2014), ± two month old tilapia seeds are given artificial feed (granular) with a protein content of 25-50 percent. The type and composition of feed must also be in sync with the availability of enzymes in the fish's digestive tract, as a result the feed will be digested well and the energy produced for growth will be greater.

Time and frequency of feeding

Table 4. frequency of feeding

Age	Frequency	Time (WITA)
1-21 days	3 times a day	08.00
		12.00
		17.00
22- harvest	2 times a day	08.00
		17.00

The time and frequency of giving to seeds is divided into two, namely during the monosex process and after monosex and the nutritional requirements are also different. This is because with a frequency of 3 times a day and carried out until the 21st day, the masculinization of the fish can be said to be successful, namely from the female to virility. Then continue with the frequency and time of administration after monosex is done twice a day until harvest.

Feeding method

The feeding method applied by cultivators is manual by placing the feed in a ladle and then spreading it using a modified ladle. Manual feeding is also better because the feed frequency can be adjusted according to needs, whereas if you use a tool the feed frequency cannot be adjusted. This is the same as the opinion of Mundriyanto et al. (2017) who explained "The frequency of feeding can be adjusted according to needs,

whereas when using tools, the frequency of feeding cannot be regulated but depends on the activity of the fish."

At the beginning of the transfer of the seeds to the nursery pond, the feed is distributed throughout the pond, this is done in order to know the aroma of the feed. After doing this for several days, feed is given at one point. This means that the fish gather at one point. Feeding is done slowly with the aim that the food is completely eaten and nothing sinks. This is because sinking feed can become sediment and become waste. Spreading feed at the right time interval will accelerate growth and feed efficiency. This agrees with Mundriyanto et al. (2017) who explains "The perfect frequency and interval when feeding will increase the rate of per-flora and the degree of efficiency of the feed provided".

Amount of feeding

The feed given when rearing fish fry during masculinization and when transferred to the nursery pond is different, namely 412 grams which have been mixed with steroid ingredients for one administration to the fry which are being masculinized, while the fry which have been transferred to the nursery pond are given as much feed as 1.5 kg which has been mixed with probiotics and herbs. The amount of feed given is done using the ad satiation method or as much as desired.

Seed growth

The growth of tilapia seeds measuring 1 cm is influenced by the quality and amount of feed provided. From the results of observations at the beginning of cultivation, it was found that tilapia fish seeds were 1cm in size and weighed 42g/1000 fish and at the end of the observation, tilapia fish seeds were 2-3.5cm in size and weighed 350gr-400g/1000fish. From the growth of the fish seeds, feed influences growth both in terms of length and weight of the fish seeds. This is in line with the statement of Mulyani et al. (2014) Feed is the main source of growth energy and is a component of expenditure in production which is not small. Commercial feed also contains protein, as a result if feed management is not good it can result in the accumulation of ammonia which increases the rate of decline in water quality. Length measurements were carried out at the beginning and end of maintenance using the formula according to Effendie (2002) in Mulyani et al. (2014) :

- Survival Rate

  From the results of the interview, the survival rate of tilapia fish seeds up to the rearing stage was 110,000 from an initial stocking density of 140,000 fish. The survival obtained during rearing of nirvana fish seeds was used according to the formula according to Effendie (2002) in Mulyani et al. (2014) :

  $SR = \frac{Nt}{No} x\ 100\%$

  $SR = \frac{110.000}{140.000} x\ 100\%$

  $= 78,5\ \%$

  Information : SR = Survival rate (%), Nt = Number of fish at the end of rearing (tail), No = Number of fish at the start of rearing (tail).

- Weight growth is carried out at the end of rearing of tilapia fry. The formula used is according to Effendie (2002) in Mulyani et. al. (2014) :

  W= Wt-Wo

  W = 0,35gr – 0,042gr

  = 0,308gr

  Information : W = weight growth (gr), Wt = final weight of fish (gr), Wo = initial weight of fish (gr)

Water Quality

Water quality measurement is an activity carried out to control so that water quality is maintained. Water quality also plays an important role in cultivation activities. The water temperature was found to be 26℃, which is still considered stable for cultivating freshwater fish such as tilapia. Azhari et al. (2018) said that the good temperature range for freshwater fish is 25-30℃. Temperature measurements are taken in only 1 pond because the location of the pond is the same or parallel..

The next quality measurement, namely DO, is carried out at two points, namely inlet and outlet because the DO range will definitely be different. In monosex ponds, DO was found at the inlet of 4.89mg/l and the outlet of 3.90mg/l. The dissolved oxygen obtained was still within tolerance limits. This is in accordance with (Popma and Masser, 1999) in Mulqan et al., (2017) that tilapia can survive at a dissolved oxygen (DO) content of more than 0.3 mg/l, very below the tolerance limit for most farmed fish. Although tilapia can survive at low oxygen levels for several hours, tilapia ponds must be regulated to maintain dissolved oxygen levels above 1 mg/l.

Figure 7. Temperature and DO measurements

The pH measurement obtained during the activity was 8.13. in accordance with the statement of Effendi (2003) in Mulqan., (2017) that the optimal pH range for raising tilapia fish is 6-8.5. If the pH in the waters is not optimal, the fish will be easily stressed, attacked by disease and their growth productivity will be low so that the pH has an important role in fisheries because it is related to growth and productivity.

Figure 8. pH measurement

CONCLUSION

From the activities carried out in cultivating Nirvana tilapia seeds. Feeding seeds with a length of 1 cm that are reared for 1 month must go through the monosex stage for 21 days with feed mixed with steroid ingredients three times a day at 08.00 WITA, 12.00 WITA, and 17.00 WITA, amounting to 310-432 grams for 11 rearing ponds. After passing the monosex stage, fish seeds are fed with a mixture of probiotics and herbs twice a day at 08.00 WITA and 17.00 WITA, 1.5 kg at a time using the ad satiation method..

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