GROWTH RATE AND SURVIVAL CULTIVATION OF TILAPIA FLOATING NET CAGES SYSTEM WITH PROBIOTIC GIVING

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Abstract

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To be able to respond to the dynamics of stakeholder demand preferences, the tilapia business enlarger should always innovate. This research has special purpose, that is (1) Analyzing cost and return of experiment of intensification of tilapia enlargement of floating net cage system with and without probiotics, (2) To analyze growth rate and survival rate cultivation of tilapia floating net cage system with and without probiotics.
This research is a collaborative research survey and experiment. The survey was conducted on 50 indigenous tilapia business actors, as a source of data for analysis of return cost ratio. Experimental research was conducted to determine the effect of probiotic dose on feed to the growth rate and survival of tilapia. Sampling using quota random sampling method, with the number of respondents 50 people. The effect of probiotic dose on feed on the growth rate and survival of tilapia was analyzed using variance analysis. Cost and return of experiment intensification of tilapia enlargement of floating net cage system with and without probiotics was analyzed by return cost ratio (RCR) analysis.
The results showed that the maintenance of tilapia fish floating net cage system with the provision of probiotics has a RCR coefficient greater than without the provision of probiotics. Provision of probiotics significantly affect the rate of growth and survival of tilapia.

Keywords: floating net cages, probiotics, growth rate, survival

1. INTRODUCTION

1.1 Background

Gradually the Indonesian people experience multidimensional changes, one of which involves changing people's preference in consuming meat, from meat to fish. This change in people's consumption preferences has contributed to the increasing consumption of Indonesian per capita fish from 33.86 kg per capita per year in 2012 to 35.21 kg per capita per year in 2013 and increased to 41.11 kg per capita per year in 2015. Increased consumption of fish is also driven by the rapid growth of culinary tourism. The phenomenon has been carefully captured by culinary entrepreneurs, by offering a special menu of fish with varying variance, which then results in increased demand for fresh fish.

Responding to the increasing trend of demand for fish, the business of tilapia enlargement of floating net cage system in Lake Batur motivated to increase its production capacity. Various efforts have been made, including improvements to the building floating

net cage system and feed doses. However, efforts to increase the production, is still constrained by the longer time required to achieve a certain weight target at the business of tilapia fish enlargement. The results of the research team's survey of the business groups of tilapia farmers with the floating net cage system at Lake Batur on 11 and 12 May 2017 showed that in the period before 2012 the time of tilapia rearing to reach 300 gram per head for only four months, required to achieve the same weight (300 grams) to> 6 months. Many factors are suspected to affect the growth rate of tilapia, such as lake water quality, fish seed quality, feed quality, stocking density, and feeding method.

The challenge to reduce the time required to achieve the weight of 300 grams per tail is a major problem that is very urgent and important solution so that the business cultivation of tilapia floating net cage system can respond to the dynamics of demand preferences both in terms of quantity and quality. The weight of the fish becomes a matter of great concern for the success of the harvest. The weight of the fish depends on the nutrients of feed given, so in the cultivation of tilapia fish, the efficiency of feeding is considered by taking into account Food Conversion Ratio (FCR) is the amount of feed needed to produce 1 kilogram of meat. Entrepreneurs of cultivation of tilapia floating net cages system take into account the problem of feed due to the price of fish feed is not cheap. Economic principles are still applied, where they want to increase the weight of fish with low conversion of feed, so that the higher profit will be obtained.

During this time, the business enlargers of tilapia fish floating net cage system in Lake Batur do feeding manually by spreading the feed on each pond or hand feeding. It is considered less effective, because the tilapia need to eat at night. Hand feeding is also considered to reduce the nutrients from the feed given because the feed nutrition will be reduced if submerged in water for too long. If the spread of the feed is done according to the schedule specified, but the fish do not feel hungry then the fish eat the feed but the nutrients contained is gone, it will decrease the final weight of the fish and also the level of profit.

It can not be denied that the business cultivation of tilapia floating net cage system in Lake Batur is profit oriented. Technology that is able to provide the highest profit per unit of time becomes the dream of all businessmen enlarging tilapia floating net cage system in Lake Batur. This research is trying to get solution related to existing problems faced by business perpetrator of enlargement of floating net cage system at Lake Batur. Through the study of doses of probiotics per kg of commercial feed is expected to find the appropriate technology that can improve the food conversion ratio (FCR) which ultimately also leads to increased profits obtained by business cultivation of tilapia floating net cage system in Lake Batur. Model of fish tilapia enlargement floating net cages system in Lake Batur which is the product of this study is expected to contribute as follows.

1) Increasing the motivation of business cultivation of tilapia floating net cage system in improving productivity.
2) Providing economies of scale and efficiency appropriate for the business cultivation of tilapia floating net cage system.
3) Provide maximum profit achievement for the business cultivation of tilapia floating net cage system
4) Provide opportunities for business expansion and the sustainability of the business cultivation of tilapia floating net cages system.

1.2 Specific Purpose of Research

Specific objectives of research namely

1) Analyzing cost and return experiment intensification of tilapia floating net cage system with and without probiotics.
2) Analyze the rate of growth and survival of tilapia floating net cages system with and without probiotics

2. RESEARCH METHODS

2.1. Research model

This research was designed with approach of survey and experiment research. Survey research was conducted on 50 business practitioners of tilapia breeding system in Lake Batur to obtain data related to efficiency cultivation of tilapia floating net cage system. Experiments were conducted to determine the effect of giving probiotics to feed on the growth rate and survival of tilapia.

2.2 Research Sites

This research will be carried out at Lake Batur, Kintamani District, Bangli Regency of Bali Province. The selection of the location of the study was intentionally based on the consideration that (1) Batur Lake, Kintamani district became the center of tilapia breeding business, (2) tilapia breeding business has been done by fish farmer continuously since 2003, 3) farmers tilapia business enlargers have established institutions as a vehicle to expand the network of cooperation with stakeholders.

2.3 Population and Sample

The population in this study were all members of the business group of tilapia farming in Lake Batur, Kintamani District, Bangli Regency, amounting to 50 groups with 250 members. Sampling using quota random sampling method with the number of respondents as much as 50 people business enlargers tilapia.

2.4 Data Collection Method

In this study data collection was conducted using (1) survey method that is direct interview with respondent using pre-prepared questionnaire list, and (2) direct observation and recording (for experiment). Primary data was obtained in the field from the first source, that is the respondent of tilapia cultivation business. The data collected include respondent characteristics, use of fixed inputs and variables in each production cycle, number of seed production per cycle, input price, output price (production).

2.5 Measurement of Variables

The variables involved in this study were measured as follows.

1) The amount of feed measured from the amount of feed spent in one production cycle is expressed in kg.
2) The dose of probiotics is measured by the number of probiotics spent in one production cycle expressed in ml.
3) The amount of labor is calculated from the amount of labor used in one production cycle expressed in the work people day.
4) The number of seeds is the number of seeds stocked expressed in the tail
5) Cage volume is the length of floating net cages multiplied by the width and height stated in m^3.

6) Amount of output (yield of enlargement) is the amount of tilapia produced in one production cycle expressed in kg.

2.6 Data Analysis Method

Experimental studies of the effect of probiotic doses on feed on the growth and survival of tilapia with randomized factorial group design were analyzed using variance analysis. Cost and return of cultivation of tilapia floating net cage system is analyzed with Return Cost Ratio (RCR)

3. RESEARCH RESULT AND DISCUSSION

3.1 Potential of Lake Batur

Lake Batur is a type of active caldera lake located at an altitude of 1,050 meters above sea level. The water surface area of the lake is 16.05 km2 with a water volume of 815.38 million m^3 and an average depth of 50.8 m. The water of Lake Batur is sourced from rainwater and seepage from the surrounding mountains with a total catchment area of 105.35 km^2 (Bappeda Bali, 2004).

Lake Batur is a multi functional lake. Suryati and Samuel (2012) stated that the existence of Lake Batur provides a beneficial function for people's life that is (1) serves as a source of water that appears to be a spring in some places in Bali. Water seepage of Lake Batur is a source of fresh water for most of the rivers located in Bali, so it can be said that Lake Batur is a giant water tower that supplies fresh water needs for the community in Bali Island; (2) serves as a water source for agricultural activities (vegetable farming); (3) serves as a tourist attraction; (4) serves as a place of religious activity; and (5) serves as a place for the cultivation of land fisheries.

The function for terrestrial activity has positioned Lake Batur as a center for tilapia. Maintenance (enlargement) fish value is done with floating net cage system. The area of Lake Batur waters that has been utilized for the business of tilapia fish breeding with floating net cage system until 2014 is only 3.5 ha, while the potential that can still be developed for the maintenance of tilapia fish with floating jamb cages system of 12 ha. Currently, there are 50 groups of tilapia breeding business practitioners with floating cage floating system operating in Lake Batur.

Floating net cage is a means of maintenance of fish whose skeleton is made of bamboo, wood, paralon or square iron pipe which is given the jarring and float so that the container is still floating in the water. Floating net cage is an appropriate technology that is excellent for farmers because it has proven to be more efficient, both technically and economically. Entrepreneurs are very enthusiastic in producing the use of floating net cages, and raced to increase production to respond to the dynamics of consumer preferences in terms of quantity and quality.

3.2 Cost and Return Cultivation of Tilapia Floating Net Cage System

Costs incurred by fish farmers consist of fixed costs and variable costs. Fixed costs are costs incurred by a fish farmer whose size is independent of the amount of production. Fixed costs incurred include: the cost of shrinkage of cage, the cost of shrinkage of the sampan, bucket, and net. The variable cost is the cost incurred by the cultivators in doing their business which depends on the amount of production. The non-fixed costs incurred by the farmers are the cost of purchasing seeds, the cost of purchasing the feed, the wage of labor.

For the maintenance of tilapia without the provision of probiotics, the fixed cost used is Rp. 1.361.333, and the amount of non-fixed costs used in a single production process of Rp. 8,360,000. so the total cost incurred amounted to Rp 9,721,333.00,- The number of tilapia in the cultivation without the probiotic has a stocking density of 3000 tails. With mortality rate of fish 33% for, then the number of death that is 33100 x 3000 tail = 990 tail. That way, then the production to 3000 tail - 990 tail = 2,010 tail. While the weight of fish when harvested is 250 grams, the production amount is equal to 2,010 x 250 = 502,500 gram or equal to 502,5 kg. Return of tilapia fishery is 502,5 x Rp 20000 = Rp 10,050.000, - Average net income received by tilapia fish farmer is Rp. 664.037,00,- Details of the cost and return of tilapia cultivation of floating net cage system without and with the provision of probiotics are presented in Table 1.

Table 1. Cost and return of tilapia cultivation of floating net cage system without and with giving probiotics

Description	Cultivation of tilapia without probiotic	Cultivation of tilapia without probiotic
Fixed cost	1.161.333	1.161.333
Variable cost	8.224.630	7.848.752
Total cost	9.385.963	9.010.085
Return	10.050.000	11.400.000
Income	664.037	2.389.915
R/C	1,07	1,27

The value of RCR obtained from the cultivation of tilapia fish business without the probiotic is 1.07, and with the probiotic obtained RCR of 1.27 which means that every 1000 rupiahs cost incurred can produce greater acceptance in the cultivation system by giving probiotics, so fish cultivation indigo floating net cage system with the provision of probiotics in Lake Batur is more profitable and feasible to continue.

3.3 Rate of Growth and Survival of Tilapia

The experimental observation data were analyzed using variance analysis (F-test). The results showed that there was a significant effect of probiotic on the growth rate and survival of tilapia (p <0,5). Provision of probiotics with a dose of 150 ml per kg of feed provides the highest growth and survival rates. The increase of probiotic dose from 150 ml per kg of feed to 200 ml per kg of feed resulted in lower growth rates and survival of tilapia. Thus giving probiotics with a dose of 150 ml per kg of feed is the most ideal dose because it can spur the best growth and produce the highest survival. The survival of tilapia with 150 ml probiotic doses per kg of feed reaches 76%, thus higher than the result of Anggriani, et al (2012) study which achieves 70% of tilapia survival. Provision of probiotics should be adopted by tilapia inducers so as to be able to produce higher and gain greater benefits. Different test results of two mean values indicate that the growth rate of tilapia is higher with probiotic than with no probiotic. Similarly, the survival of tilapia is higher with the provision of probiotics compared with without the provision of probiotics. Provision of probiotics in the feed is intended for the feed to function optimally and produce more quality fish weight. According to Fuller (1987), probiotics affect the speed of fermentation of feed in the digestive tract, so it will greatly assist the process of food absorption in the digestion of fish.

Fermentation of feed is able to break down complex compounds into simple so ready to use fish.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

1) The value of R / C obtained by the cultivators of the business of tilapia without the probiotic is 1.07, and with the probiotic obtained R / C of 1.27 which means that every 1000 rupiahs costs incurred can produce greater acceptance in the cultivation system with giving probiotics.
2) The rate of growth and survival of tilapia is higher with probiotics than without probiotics.

4.2 Suggestions

Business practitioners of tilapia fish nursery floating net cages to adopt innovation of giving probiotics to increase production and profit of tilapia

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