Pakistan J. Zool., vol. 52(2), pp 717-726, 2020. DOI: https://dx.doi.org/10.17582/journal.pjz/20190620060624

Effect of Stocking Density on the Performance of Juvenile Gurami Sago (*Osphronemus goramy*) in the Synthetic Sheet Pond

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Article Information
Received 20 June 2019
Revised 29 July 2019
Accepted 06 August 2019
Available online 28 January 2020

Authors' Contribution
HS, AM, A and NA Surveyed the location and collected the data. HS and A analyzed the data. HS, AM, NA wrote the manuscript

Key words
Perciformes, Giant gourami, Aquaculture, Stoking density, Juvenile

ABSTRACT

Gurami sago, *Osphronemus goramy* strain is the result of newly released domestication in 2018. This species is freshwater fish native in Indonesia and has a high price in the markets. This study investigated the effect of stocking density on growth performance, body carcass composition and biometric indices of juvenile gurami sago in the synthetic sheet pond. Fish were stocked at densities of 10, 15 and 20 fish/m^3 in synthetic sheet pond with three replicate. Fish were fed with commercial feed containing 29% crude protein and gross energy of 3,340.50 kkal/kg of feed and cultured for 90 days. The physicochemical parameters of water were always at satisfactory levels for fish culture throughout the experiments except for NH_3-N (0.05 mg/L) and NO_2-N (0.02 mg/L): water temperatures ranged from 27.5 to 30.5 °C, DO 4.3 to 5.6 mg/L, pH 6.56 to 6.96, alkalinity 50.65 to 52.25 mg/L, and hardness 6.65 to 66.85 mg/L. Survival was high at 100.0% in synthetic sheet pond at 10, 15 and 20 fish/m^3, respectively. Density significantly affected ($p<0.05$) final mean weight (164.72±2.20, 155.34±1.40, 138.40±0.98 g) and percent weight gain (113.04±5.10, 100.89±3.41, 78.98±2.63%), specific growth rate (0.84±0.03, 0.78±0.02, 0.65±0.02%/day), apparent food conversion ratio (1.69±0.03, 1.74±0.02, 1.85±0.03), and condition factors (1.48±0.05, 2.56±0.03, 2.75±0.04). In contrast, the protein of carcass (19.02±0.11, 18.44±0.12 and 17.82±0.15%), hepatosomatic and visceral fat index were not significantly ($p>0.05$) affected by stocking density. The high survival and fast growth rates of gurami sago stocked demonstrated that the synthetic sheet ponds are a viable alternative method as standard ponds for the commercial production of gurami sago.

INTRODUCTION

China ranks first (61.5%) in global aquaculture production, followed by India, Indonesia, Vietnam, Bangladesh, Egypt, Norway, Chile, Myanmar, and Thailand (FAO, 2018). In 2016, 598 species including carp, catfish, tilapia salmon and shrimp were recorded in aquaculture (FAO, 2018). In Indonesia, freshwater aquaculture commodities such as clarias, pangasius, carp and tilapia have grown very quickly. These species have contributed as much as 14.0%, 11.0%, 13.4% and 22.7% to the Indonesian aquaculture production, respectively (Tran *et al*., 2017). Each of these fish commodities has played an important role in the Indonesian economy through income generation, livelihood diversification, and supply of animal protein for rural and urban communities (Syandri *et al*., 2015; Negara *et al*., 2015; Hayandani *et al*., 2013). Meanwhile, giant gourami (*Osphronemus goramy*) has not yet been a major contributor to the freshwater fish production in Indonesia since this species has lower growth rate compared to Nile tilapia and common carp fishes (Aliah, 2017; Sulawesty *et al*., 2014; Ayisi *et al*., 2017; Thongprajukaew *et al*., 2017). However, giant gourami fishes are resistant to poor water quality and have a high price in the Indonesian market (Budi *et al*., 2015; Aryani *et al*., 2017a). They are currently cultured in traditional ponds (Tran *et al*., 2017; Thien *et al*., 2015; Pouil *et al*., 2019).

The giant gourami, belonging to the local ″gurami sago″ strain has never been intensively cultured because the ″gurami sago″ is the result of newly released domestication in 2018 (Ministry of Marine and Fisheries

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0030-9923/2020/0002-0717 $ 9.00/0

of the Republic of Indonesia, 2018). This species is a herbivorous freshwater fish found in Lima Puluh Kota District, West Sumatra-Indonesia. Based on its high market value and demand, the gurami sago strain has not been successfully cultivated intensively in ponds, and relevant aquaculture studies are completed to date is the effects of salinity on survival and growth of juveniles (Azrita and Syandri, 2018). On the other hand, the giant gourami, belonging to the local "tambago and galunggung" strain has been identified as one of the best prospects for a semi-commercial scale culture (Aryani *et al*., 2017a; Trans *et al*., 2017; Arifin *et al*., 2019).

Many factors affect the growth and survival of fish farming, such as feeding rate, frequency and time (Du *et al*., 2006; Sun *et al*., 2016; Aryani *et al*., 2017a), additionally, fish stocking density plays a role (M'balaka *et al*., 2012; Gokcek and Akyurt, 2007; Kareem and Olanrewaju, 2015; Tibile *et al*., 2016; Bag *et al*., 2016; Aryani *et al*., 2017b; Timalsina *et al*., 2017). The effects of stocking density on fish survival, growth performance, feed efficiency and body composition have been determined for several species, including the Bata *Labeo bata* fry and fingerlings in ponds (Chakraborty and Mirza, 2007), pirarucu *Arapaima gigas* juvenile in cages (de Oliveira *et al*., 2012), Indian major carps *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* fingerlings in a gently sloping drainage basin (Bag *et al*., 2016), Discus *Symphysodon aequifasciatus* juvenile in glass aquarium tanks (Tibile *et al*., 2016), Korean rockfish *Sebastes schlegeli*, Nile tilapia, *Oreochromis niloticus* in cage (Hwang *et al*., 2014; Gondwe *et al*., 2011) and Bonylip barb *Osteochilus vittatus* larva in synthetic sheet pond (Aryani *et al*., 2017b). However, the effects have not yet been studied in the gurami sago juveniles in synthetic sheet pond.

Various efforts have been made by scientists to determine appropriate stocking densities for increased growth and survival but until now recommended stocking densities vary considerably for each fish species (de las Heras *et al*., 2015; Watts *et al*., 2016; Timalsina *et al*., 2017). Meanwhile, each fish species has different space requirements for growth and fish survival in aquaculture operations. Therefore, optimum stocking densities need to be determined for each species during the production phase to enable efficient management and maximum production per unit space available, profitability and with limited land resources. The main aim of this study was to determine whether stocking density has any effect on the growth performance, feed efficiency and biometric indices of the gurami sago in synthetic sheet pond.

MATERIALS AND METHODS

Fish culture technique

Gurami sago juveniles were collected from a private hatchery in the Luak District, specifically the Lima Puluh Kota Region of West Sumatera Province, and transported to the Research Center, Faculty of Fisheries and Marine Science of Bung Hatta University in Padang City. Fish were treated with a prophylactic formalin bath (100 mg L^{-1}) for 1 h to remove external parasites and acclimatized to synthetic sheet pond (4 × 2 × 1 m) with the capacity 5,600 L for one month before the experiment. During the acclimatization, juveniles were fed with commercial floating feed (pelleted) which have proximate composition (dry weight %), 12% moisture content, 29% crude protein, 5% crude fat, 6% crude fiber and 6% crude ash. Feeding was done twice daily and fish were fed a predetermined ratio of 3% b.wt., day^{-1}. Continuous aeration was provided along with 20% replacement of water with fresh bore-well water.

This study was performed in January until April 2019. Nine units of synthetic sheet pond, each with a size of 2 × 1 × 0.6 m, were used for culturing gurami sago juveniles. The average initial weight and length of the fish were 77.34±1.15 g and 14.77±1.50 cm (mean ± SD), respectively. The initial length (cm) and weight (g) of the fish were determined using a measuring scale and a digital electronic balance (OHAUS, Model CT 1200-S, USA), and these values were recorded.

Experimental design

The stocking densities (1 synthetic sheet pond each of 10 fish/m^3, 15 fish/m^3 and 20 fish/m^3) were designated as T_{10}, T_{15} and T_{20}, respectively, and repeated in triplicate for each treatment group. Gurami sago juveniles were reared for 90 days and fed three times a day at 09:00, 13:00 and 18:00 hours with commercial floating pelleted feed. The chemical composition of feed was gross energy of 3,340.50 kkal/kg, made up of 29% crude protein, 5% crude fat, 6% crude ash, 12% crude fiber and 12% moisture content (Analysis result of Animal Science Laboratory Bung Hatta University). Fish were fed at rates of 3.0% body weight/day until study termination. Fish were sampled every 30 days to evaluate growth in weight and length, and fish were fasted for 24 h before sampling. For sampling, 50% of fish in each synthetic sheet pond were captured with a gillnet that formed a net bag of the appropriate mesh size and anesthetized by orally with Tricaine methanesulfonate (MS-222, ethyl 4-aminobenzoate methanesulfonate 98%, Sigma Aldrich Co, USA, MO; 50 mg L^{-1}), based on the dosage used for *Solea senegalensis* (Weber *et al*., 2009), and their weights and lengths were measured. After each sampling period, the amount of feed was adjusted depending on the mean weight and biomass in each floating net cage. The biomass of the fish was calculated, and the amount of feed was adjusted. The feed intake was recorded daily. Following an evaluation, the fish were returned to their floating net cages. No mortality was noted.

Proximate composition analyses

Proximate composition analyses of the experimental diet and whole fish body were performed by the standard methods of the Association of Official Analytical Chemists (AOAC, 2000). After the completion of the experiment, three fish from each treatment group were collected for further analysis of body carcass composition. To determine the moisture content, samples of the diets and wet fish were dried at 135°C for two hours. The ash content was determined by using a muffle furnace (600°C for four h). The crude lipid content was determined using a Soxhlet apparatus with the Soxhlet system 1046 (Foss, Hoganas, Sweden). The crude protein content was determined by the Kjeldahl method (N × 6.25) after acid digestion, distillation and titration of samples. The total carbohydrates were determined by subtracting the sum of % crude protein, % crude lipid, % crude ash, and % moisture contents from 100 (AOAC, 2000). The samples were analyzed in the Animal Science Lab, Department of Aquaculture, Faculty of Fisheries and Marine Science Bung Hatta University, Padang, Indonesia. Fish length and wet weight and liver, viscera and visceral fat weights were recorded to calculate the condition factor, hepatosomatic, visceral and visceral fat indices.

Water quality

The water samples were collected at 00.90 AM a depth from each synthetic sheet pond for the determination of the dissolved oxygen (DO) and chemical oxygen demand (COD) contents. An oxygen meter (YSI model 52, Yellow Spring Instrument Co., Yellow Springs, OH, USA) was used *in situ*, and pH values were determined with a pH meter (Digital Mini-pH Meter, 0-14PH, IQ Scientific, Chemo-science, Thailand) Co., Ltd, Thailand). Water temperature was measured using a thermometer (Celsius scale). The levels of ammonia-nitrogen (NH_3-N), nitrite-nitrogen (NO_2-N) alkalinity, hardness and total suspended solids of the water in each replication were measured according to standard procedures (APHA, 1995).

Measurements parameters

To determine the growth performance of the fish, the following parameters were calculated: body weight gain (BWG, %), specific growth rate (SGR %/day), coefficient of variation for final body weight (CV%), feed conversion efficiency (FCE), apparent food conversion ratio (AFCR), survival rate (SR), condition factors (CF), visceral index (VSI), hepatosomatic index (HSI) and visceral fat index (FVI). The parameters were analyzed according to Aryani *et al*. (2017a), Iqbal *et al*. (2014), Wang *et al*. (2005) and Moutinho *et al*. (2017) with the following equation:

WG (%) = [(final weight – initial weight)/initial weight]×100

(SGR %/day) = $[(\ln Wt - \ln Wi)/T] \times 100$

where Wt = mean final weight, Wi = mean initial weight and T = total experimental days

CV (%): coefficient of variation for final body weight = 100 × SD/mean, where mean is average final body weight, SD = standard deviation of final body weight.

SR = (number of fish survived/number of fish stocked) × 100

FCE (%) = [fish weight gain (g)/ total feed ingested (g)] × 100

CF = [wet weight (g) / length^3 (cm)] × 100

VSI = [visceral weight (g) / wet weight (g)] × 100

HSI = [liver weight (g) / wet weight (g)] × 100

FVI = [visceral fat (g) / wet weight (g)] × 100

Feed efficiency: Data on the feed efficiency were also collected and analyzed by calculating the apparent food conversion ratio (AFCR) using the formula below;

AFCR = Dry weight of feed given/Gain in weight

Data analysis

Statistical analyses of data were carried out with SPSS 16.0 software package (SPSS; Chicago, IL). Normality was tested using Kolmogorov Smirnov statistic. Homogeneity was checked using the absolute residuals according to Levene's test. Effect of treatment was carried out using both one way ANOVA, followed by a post hoc Duncan's multiple range tests (Duncan, 1955). Differences were considered significant at the 95% confidence level ($p < 0.05$). All means are given with ± standard deviation (±SD).

RESULTS

Determination of weight growth responses

The growth performance of gurami sago during the experimental period at 30, 60 and 90 days is shown in Figure 1. The lowest final weight was observed in T_{20}, followed by T_{15} and T_{10}. The average weight, total length and percentage weight gain at 30 and 90 days are recorded in Table I.

The average weight (g), average total length (cm) and weight gain (%) of juvenile gurami sago reared at various densities did not differ significantly ($p>0.05$) at the end at 30 days of culture. While at 90 days of culture were significantly ($p<0.05$) affected by stocking density (Table I). Furthermore, the mean SGR of juveniles gurami Sago

Table I. Average weight-average total length* and a percent weight gain of gurami sago at three different stocking densities.

Stocking density	Average initial weight (g)	Average weight (g)		Average total length (cm)	Average total length (cm)	Percent weight gain	
		At 30 days	At 90 days	At 30 days	At 90 days	At 30 days	At 90 days
T_{10}	77.34±1.15	96.73±0.40[a]	164.72±2.20[a]	16.50±1.68[a]	20.40±2.22[a]	25.10±2.16[a]	113.04±5.10[a]
T_{15}	77.34±1.15	95.42±0.26[a]	155.34±1.40[b]	17.5±1.08[a]	20.10±1.45[a]	23.40±1.73[a]	100.89±3.41[b]
T_{20}	77.34±1.15	92.01±0.11[a]	138.40±0.98[c]	16.47±1.49[a]	19.05±2.83[a]	21.99±1.88[a]	78.98±2.63[c]

[1]Values (means ± SD of three replicates) in the same row with different superscripts are significantly different (p<0.05). *Initial lengths of gurami sago juveniles 14.77±1.50 cm.

Table II. Specific growth rate (%) per day*, coefficient of variation (%) and feed conversion efficiency of gurami sago at three different stocking densities.

Stocking density	SGR %/day		Coefficient of variation (%)		FCE (%)	
	At 30 days	At 90 days	At 30 days	At 90 days	At 30 days	At 90 days
T_{10}	0.75±0.06[a]	0.84±0.03[a]	0.42±0.01[a]	1.34±0.02[a]	27.89±2.40[a]	31.45±1.27[a]
T_{15}	0.70±0.05[a]	0.78±0.02[b]	0.28±0.01[b]	0.90±0.01[b]	26.00±1.93[b]	28.02±0.84[b]
T_{20}	0.58±0.05[a]	0.65±0.02[c]	0.12±0.01[c]	0.71±0.01[c]	21.40±2.09[c]	23.90±0.64[c]

Values are mean ± SD (n = 3); column values with different superscripts are significantly different (p<0.05); *SGR per day = e^{GW-1}·100, where GW is the instantaneous growth rate (Ln final weight-Ln initial weight)/time in days

reared at various densities did not differ significantly (p>0.05) at 30 days of culture. Whereas, the mean SGR at 90 days, coefficient of variation for final body weight (CV %) and FCE at 30 and 90 days of culture were significantly (p<0.05) affected by stocking density (Table II). At the end of the rearing period (90 days), the treatment T_{10} showed better AFCR than other treatments (Fig. 2). The mean survival rates of all treatments in synthetic sheet pond was 100%.

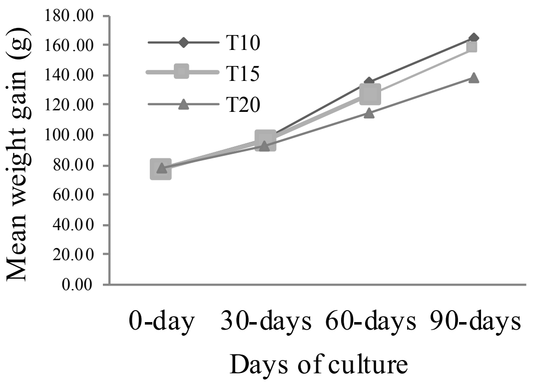

Fig. 1. Mean weight gain ± SD (g) of gurami sago at three different stocking densities

Body carcass and biometric indices of fish (mean ± SD)

In the present study, proximate analysis of body carcass on wet weight basis showed the protein, fat and carbohydrate contents at 90 days among treatments were not significantly (p>0.05) affected by stocking density (Table III). Furthermore, the measured biometric indices (condition factor and visceral index) were significantly different (p<0.05) for stocking densities (Table IV).

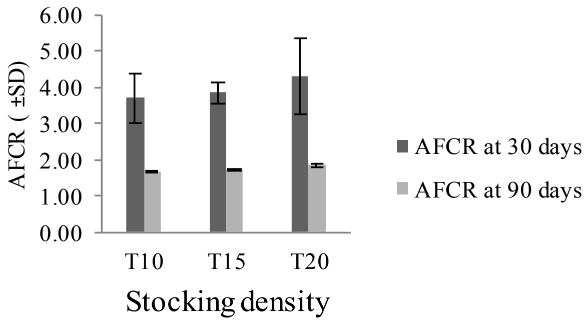

Fig. 2. Mean feed efficiency (AFCR) ± SD (%) of gurami sago at three different stocking densities.

Water quality parameters (mean ± SD)

All water quality parameters tested except NH_3-N and NO_2-N were within the permissible range (Fig. 3). The concentration of ammonia-nitrogen (NH_3-N) and nitrite-nitrogen (NO_2-N) increased with an increase in stocking density. Levels of NH_3-N and NO_2-N exceeded 0.05 mg/l and 0.02 mg/l from days 30 to 60 and onwards at the T_{10}, T_{15} and T_{20}. Water temperature during the experiment ranged from 27.5 to 30.5 °C.

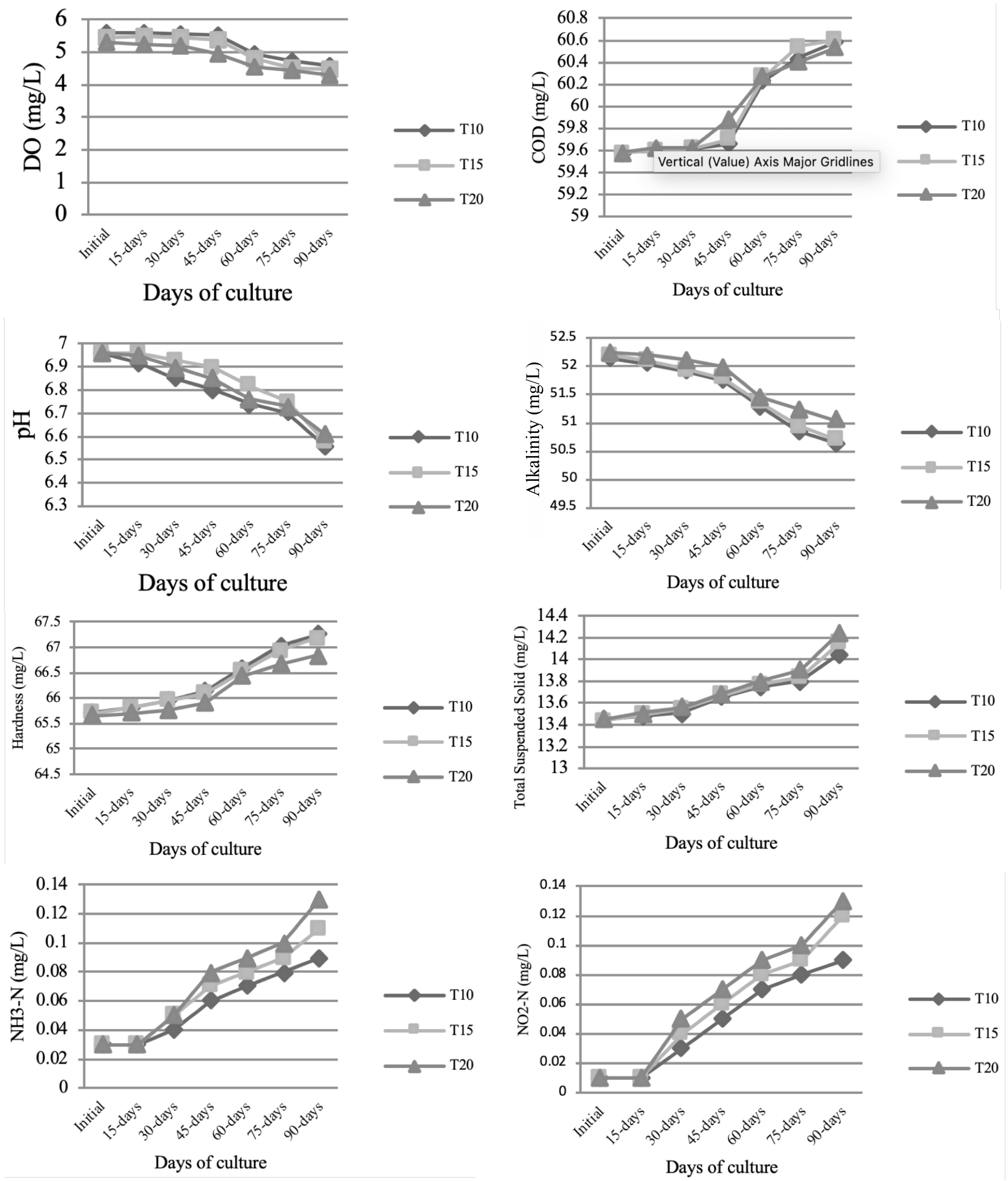

Fig. 3. The water quality parameters observed during culture of gurami sago different stocking densities over a period of experiment.

DISCUSSION

Our results reveal that the effect of stocking density on the growth rate of juvenile gurami sago can be separated into two different phases and may explain the significant differences found. In the first phase, covering between days 0 and 30 of the experiment, the growth rate showed a similar trend in all experimental groups, however, in the second phase (from day 30 to 60 and onwards) increased stocking density had a negative effect on mean weight gain, mean total length and percent weight gain. The growth of gurami sago juveniles is lower than of gurami tambago juveniles. A similar response not yet previously observed in other fish species in different stages of development (Aryani *et al*., 2017a; Tibile *et al*., 2016; Desai and Singh, 2009). In this study, food consumption was not a limiting factor during the experimental time because fish were observed and controlled to ensure that feeding occurred three times per day proportionally to body mass. The water quality in the synthetic sheet pond in T_{10}, T_{15} and T_{20} was also not different.

Table III. Carcass composition (% mean wet weight basis) of the gurami sago juveniles at three different stocking densities.

Parameter	Initial (0 day)	At 90 days		
		T_{10}	T_{15}	T_{20}
Water (%)	76.51±0.30	75.59±0.13	76.22±0.34	76.87±071
Protein (%)	19.10±0.80	19.02±0.11[a]	18.64±0.12[a]	17.82±0.15[a]
Fat (%)	4.21±0.70	4.21±0.03[a]	4.19±0.01[a]	4.18±0.01[a]
Total ash (%)	0.38±0.3	0.38±0.01[a]	0.38±0.01[a]	0.38±0.01[a]
Carbohydrate (%)	0.80±0.01	0.80±0.04[a]	0.78±0.01[a]	0.78±0.02[a]

Mean values with same superscript letters in the same row are not significantly different ($p > 0.05$).

Table IV. Biometric indices of the gurami sago juveniles at three different stocking densities.

Parameter	Initial (0 day)	At 90 days		
		T_{10}	T_{15}	T_{20}
Condition factors	0.03±0.01	1.48±0.05[a]	2.56±0.03[b]	2.75±0.04[c]
Visceral index (%)	6.85±0.17	10.18±0.09[a]	9.19±0.05[b]	9.40±0.03[c]
Hepatosomatic index (%)	1.99±0.06	2.02±0.14[a]	2.05±0.11[a]	2.30±0.04[a]
Visceral fat index (%)	2.97±0.14	6.08±0.49[a]	5.39±0.35[a]	3.20±0.25[a]

Mean values with different superscript letters in the same row are significantly different ($p < 0.05$).

During the experimental period, the survival rate of gurami sago in T_{10}, T_{15} and T_{20} were 100%, respectively. Thus, it can be concluding that stocking density will not influence of the mortality rate. Many scientist states that high stocking densities may sometimes have no effect on mortality rates and may enhance total fish yield (Abou *et al*., 2007; Gokcek and Akyurt, 2007). In contrast, the growth and survival of fish species in aquaculture operations are generally affected by inadequate stocking density (M'balaka *et al*., 2012; Aryani *et al*., 2017a; van de Nieuwegiessen *et al*., 2009; Moniruzzaman *et al*., 2015; Zarski *et al*., 2011). Moreover, the growth rate is probably one of the most well studied physiological parameters related to aquaculture (Sun *et al*., 2016). Other variables related to feed efficiency and carcass composition have been studied in different species including *Barbus luteus* (Gokcek and Akyurt, 2007), *Oreochromis niloticus* (Moniruzzaman *et al*., 2015) and *Osteochilus vittatus* (Aryani *et al*., 2017b). However, each author running the experiment in cages and synthetic sheet pond. To avoid stress and economic losses, aquaculture operations must be able to manage the optimization of stocking density in different locations.

In the present study, the specific growth rate (SGR) showed the parallel direction of changes as the SGR values at days 0 to 30 were lowest than those at days 0 to 90. However, the SGR values in T_{10} were higher than those in T_{15} and T_{20}. On the other hand, lower feed efficiency (AFCR) tended to indicate higher growth in individual fish. This fact demonstrated that the digestive processes of feed tend to be optimized and lead to higher feed efficiency (M'balaka *et al*., 2012; Chakraborty and Mirza, 2007; Desai and Singh, 2009). In our study, significant differences between groups were found for this parameter. The cultured gurami sago at 90 days under different stocking densities showed a better AFCR compared to those at 30 days (Fig. 2). This indicates that the lowest stocking density gives fish a chance to consume more feed. Although, the AFCR values in T_{10}, T_{15} and T_{20} were lowest than FCR values of Nile tilapia and gurami tambago (Osofero *et al*., 2009; Moniruzzaman *et al*., 2015; Aryani *et al*., 2017a). In this study, we do not analyze the relationship between the AFCR and water quality parameters investigated in the synthetic sheet pond. Other researchers have found that the FCR values can be affected by DO level (Sun *et al*., 2016) and water temperature (Desai and Singh, 2009; Yuan *et al*., 2018). Furthermore, there was no significant difference of water quality in the aquaculture operations of gurami sago, except Ammonia-Nitrogen and Nitrite-Nitrogen (Fig. 2).

The SGR (%/day) and AFCR values of gurami sago is lower than gurami tambago (Aryani *et al*., 2017a) and galunggung (Arifin *et al*., 2019). Generally, this spesies as food sources and not yet familiar as food consumption in the society, its could be found in the traditional market. In addition, we also recommended these species for ornamental fishes, due to the beautiful color character in part of the head such as yellowish red, the upper body is dark red and thick, the lower part of the body pink tends towards blue/silver and the yellowish red fin.

In this study, the carcass composition of gurami sago in each stocking density was analyzed to confirm their nutritional status. The results demonstrated that the carcass composition was not significantly affected by the stocking density. One possible reason might be due to the expenditure of body energy in T_{10}, T_{15} and T_{20} to maintain normal metabolic activity during the experimental period. However, at the final harvest, we also noticed that fish in T_{20} were weaker than those in T_{15} and T_{10}. Other authors have shown that the nutritional status of carcass composition of the fishes is not significantly different by stocking density or fish species (Zarski *et al*., 2011; Hwang *et al*., 2016; Mateen *et al*., 2016; Du *et al*., 2006). However, the feeding rate significantly affects the carcass composition of Giant gourami, namely tambago strain (Aryani *et al*., 2017a). Meanwhile, the carcass composition is known to be influenced by many factors, such as feed quality, feed intake, geographic location, age, sex and maturity. Among these factors, formulated feed, type and ingredients are considered the most important (Sun *et al*., 2016; Moutinho *et al*., 2017; Wang *et al*., 2016; Xiaolong *et al*., 2018).

In addition to carcass composition analysis, we also analyzed the biometric indices of gurami sago at each stocking density to assay their condition factors, visceral index, hepatosomatic index and visceral fat index. The stocking density did not affect the hepatosomatic index of gurami sago, although condition factors, visceral index and visceral fat index were significantly affected by stocking density. The value of the condition factor can be affected by the weight and length of the fish of each size group (Jisr *et al*., 2018; Rodgveller, 2019). In this study, the condition factor values in T_{10} were higher than those in T_{15} and T_{20} and were related to average weight and total length at 90 days in each group. Furthermore, differences in the visceral index and visceral fat index values may be affected by the weight of the intestinal contents. It appears that T_{10} contains more visceral feed weight than T_{15} and T_{20}. In contrast, the enrichment of extruded feed with fish oil, canola oil and blend of the two oils as well as replacement of fish meal with meat and bone meal did not affect condition factors and hepatosomatic index of the fishes (Hernández *et al*., 2016; Masiha *et al*., 2013).

CONCLUSION

This study shows that gurami sago can grow efficiently with a high survival rate in the synthetic sheet pond. The data obtained suggested that gurami sago reared in a stocking density of 10 fish/m^3 shows a better growth performance. The findings of this study are relevant for the sustainable and effective synthetic sheet pond practices. The additional experiments could be conducted to determine the bio-economic analysis of gurami sago in the synthetic sheet pond and cages for the production of fish with the desired size for the market demand.

ACKNOWLEDGEMENTS

The authors thank the Ministry of Research Technology and Higher Education Republic of Indonesia for supporting this study through the competitive grants schema (*Riset Terapan Unggulan Perguruan Tinggi*) 2019. Contract number: 042.06.1.401516/2019. The appreciation goes to all of the students who helped the author during data collection in the field.

Statement of conflict of interest

The authors have no conflicts of interest to declare.

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