

The evaluation of seed production of silver arowana fish *Osteoglossum bicirrhosum* (Cuvier, 1829) with different natural feeding

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Abstract. Silver arowana fish, *Osteoglossum bicirrhosum* (Cuvier, 1829), is an ornamental fish originating from Brazil which has been popular among hobbyists. The increasing demand is not followed by an increase in fish production. To increase production, it is necessary to provide proper feed. The purpose of this study was to evaluate the production of arowana fish seeds by providing different natural feeds through growth and survival rate. This study was conducted using Completely Randomized Design (CRD). This study used 3 replications and 3 treatments (A: *Tubifex* sp., B: *Chironomus* sp., and C: combination of *Tubifex* sp. and *Chironomus* sp.). The length and weight results showed that treatment A had length of 0.45 cm, weight of 0.33 grams, treatment B had length of 3.36 cm, weight of 2.30 grams and treatment C had 1.65 cm, a weight of 1.28 grams. The survival rate showed that treatment A 60%, treatment B 100% and treatment C 67%. Based on these results, the natural feed of *Chironomus* sp. was very appropriate to increase the growth and survival rate of silver arowana fish seeds.

1. Introduction

Arowana silver *Osteoglossum bicirrhosum* (Cuvier, 1829) is a type of freshwater ornamental fish originating from Brazil [1]. The arowana fish has beautiful body shape, swimming style, and colors that attract attention [2]. Silver arowana fish is the most popular arowana fish and are widely maintained to decorate aquariums by the people of Indonesia [3]. Therefore, many farmers culture these fish.

Silver arowana fish farming activities still have several challenges, such as limited spawning season [4]. In addition, the quantity of seeds is currently not fully fulfilled, especially for good quality seeds [5]. One way to improve the quality of arowana fish seeds is by adding natural feed of *Tubifex* sp. and *Chironomus* sp since it is important for arowana fish growth food. *Tubifex* sp. is a natural food that has high nutritional value. *Tubifex* sp. is usually called hair worms. The nutritional content of *Tubifex* sp. of 41.1% protein, and 20.9% fat [6]. Apart from *Tubifex* sp., *Chironomus* sp. can also be used as arowana fish feed. *Chironomus* sp. also has a high nutritional value. The nutritional value of *Chironomus* sp. contents of 60.9% protein and 16.3% fat [7]. *Tubifex* sp. and *Chironomus* sp. are always used by the farmers for the larvae and fry of farmed fish. Based on the foregoing, it is necessary to conduct a study on the growth and survival of silver arowana fish seeds by giving *Tubifex* sp. and *Chironomus* sp. The purpose of this study was to evaluate the production of arowana fish seeds by providing different natural feeds through growth and survival rate.

2. Material and methods

2.1. Sample preparation

The 45 silver arowana fish seeds used were 6-7 cm in size and weigh 0.78-1.03 grams and originate from Lempasing, Lampung. *Tubifex* sp. and *Chironomus* sp. were also obtained from Lempasing, Lampung. This study used 3 treatments and 3 replications (A: *Tubifex* sp., B: *Chironomus* sp., and C: combination of *Tubifex* sp. and *Chironomus* sp.). Silver arowana fish seeds were given natural food ad-libitum at 08.00 am and 04.00 pm for 30 days.

2.2 Research parameter calculation

The research parameters observed in this study were growth (weight and length), survival rate and water quality parameters. The result of the weight was calculated with the following formula [8]:

$$W = W_t - W_o$$

Note:

- W : Absolute weight gain (g)
- W_t : Final average weights (g)
- W_o : Initial average weights (g)

The result of the length was calculated with following formula [9]:

$$L = L_t - L_o$$

Note :

- L : Absolute length growth (cm)
- L_t : Final average length (cm)
- L_o : Initial average length (cm)

The survival rate (SR) of fish was observed by counting the number of fish alive at the end of the study and was calculated based on the following formula [10]:

$$SR = \frac{N_t}{N_o} \times 100\%$$

Note :

- SR = fish survival rate (%)
- N_t = number of fish at the end of the study (fishes)
- N_o = number of fish at the start of the study (ekor)

Water quality parameters measured were temperature, pH, DO, and ammonia. Temperature measurement was done using a thermometer, pH measurement using a pH meter, dissolved oxygen measurement using a DO meter, ammonia measurement using a spectrophotometer as described in a previous study [12]. Water quality measurements were carried out 3 times a day.

The data were analyzed by using the normality and homogeneity test, if the data was normally distributed and homogeneous, it was continued with the variance test (ANOVA) with a 95% confidence level, if there were significantly different results, it would be followed by the Least Significant Difference test by using the SPSS 22 program [12].

3. Result and discussion

3.1. Growth of arowana fish

The highest increase in the length of silver arowana fish seeds every week occurred in treatment B (*Chironomus* sp.) and the lowest addition occurred in treatment A (*Tubifex* sp.) (Figure 1.). The highest occurred in treatment B of 3.36 cm and the lowest addition in absolute length occurred in treatment A of 0.45 cm. This can occurred due to the different protein content in *Chironomus* sp. contained protein of 60.9% [7]. Its protein value was higher than *Tubifex* sp. by 41.1% [6].

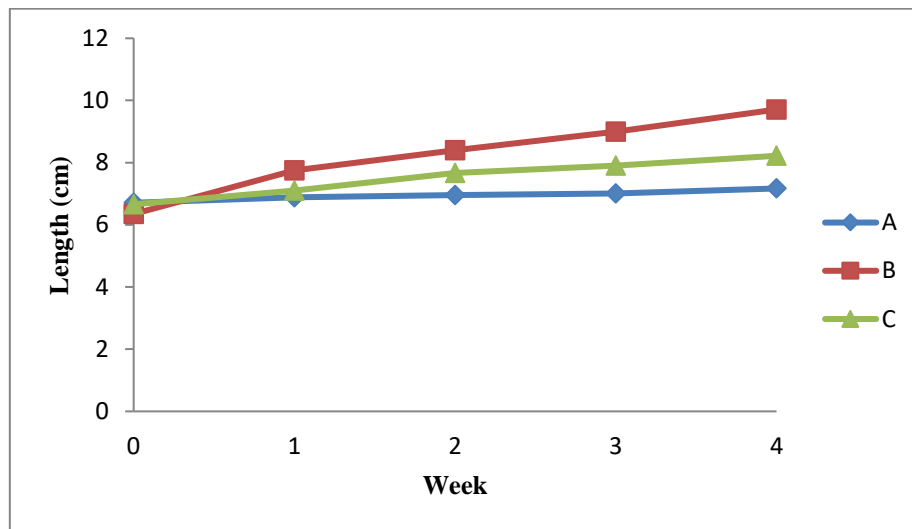


Figure 1. Length of arowana fish during study (A: *Tubifex* sp., B: *Chironomus* sp., C: Mixed *Tubifex* sp. and *Chironomus* sp.).

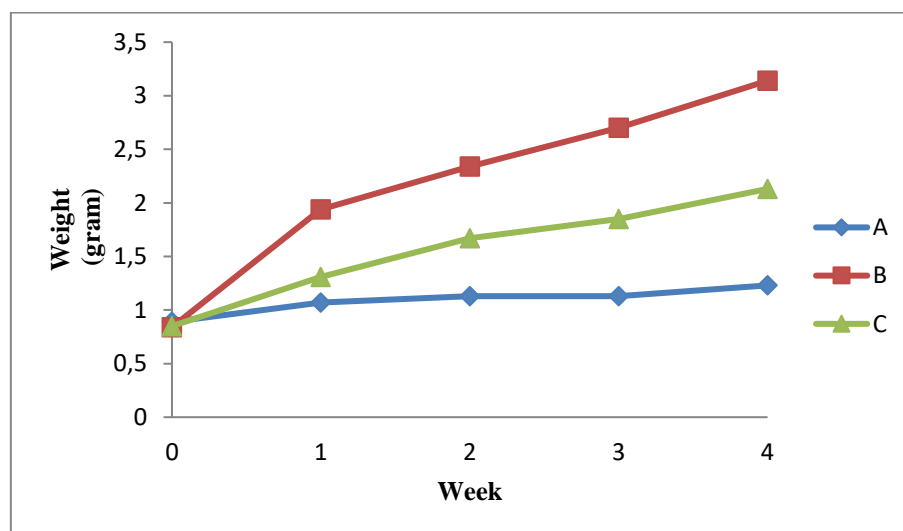


Figure 2. Weight of arowana fish during study (A: *Tubifex* sp., B: *Chironomus* sp., C: Mixed *Tubifex* sp. and *Chironomus* sp.).

The highest weight gain of silver arowana fish seeds every week occurred in treatment B (*Chironomus* sp.) and the lowest weight gain occurred in treatment A (*Tubifex* sp.) (Figure 2.). Based on the observation of the increase in absolute weight of silver arowana fish seeds in Figure 2, it was known that the highest absolute weight gain occurred in treatment B of 3.36 cm and the lowest absolute

weight gain occurred in treatment A by 0.45 cm. Treatment B was higher because *Chironomus* sp. was more active moving both on the water surface and on the water bed compared to *Tubifex* sp. which tent to be passive and colonized [13], [14]. Silver arowana fish seeds tent to prefer active feed [15].

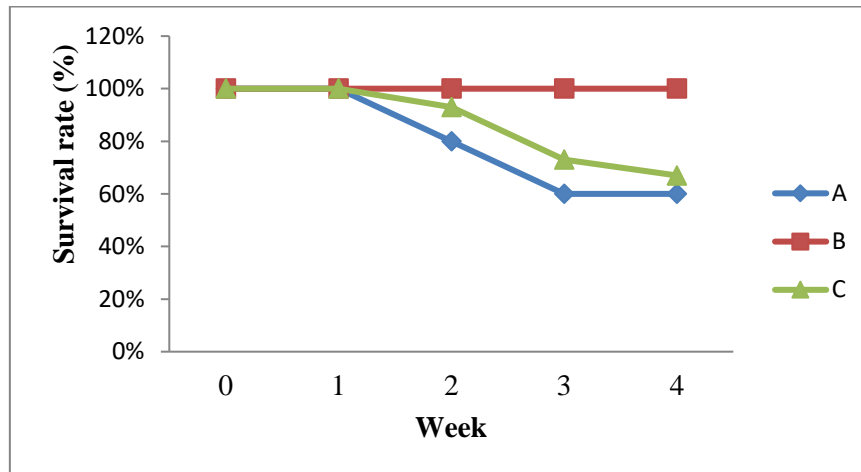


Figure 3. Survival rate of arowana fish during study (A: *Tubifex* sp., B: *Chironomus* sp., C: Mixed *Tubifex* sp. and *Chironomus* sp.).

The results of the research during the study showed that there was an effect of different natural feeding treatments on the survival of silver arowana fish seeds (Figure 3.). The life span of arowana fish in treatment B reached 100%. This was due to the high nutritional content of *Chironomus* sp. could increase metabolism and nutritional needs in arowana fish so that their survival rate is higher [16].

Table 1. Water quality parameters.in silve arowana fish culture

Parameter	Treatment			Optimum
	A	B	C	
Temperature (°C)	30	30	30	26- 30 ^[18]
pH	7.4 – 7.6	7.4 – 7.6	7.4 – 7.6	6-8 ^[19]
DO (mg/l)	5.14-5.24	5.14-5.24	5.14-5.24	5.0-6.5 ^[19]

The results of the water quality research conducted for 30 days could be seen in Table 1. Based on the results of water quality observations in Table 1, temperature, pH and Dissolved Oxygen in this study were in accordance with the general conditions for arowana fish culture [17], [18].

4. Conclusion

The natural feed of *Chironomus* sp. was very appropriate to increase the growth and survival rate of silver arowana fish seeds.

5. References

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