

The Study of different rations of spawning efficiency of siamese fighting fish (*Betta splendens*)

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ABSTRACT: The effects of five different foods including: blood worm, artemia cyst, Artemia mass powder, gammarus mass powder and ordinary commercial food were studied on Siamese fighting fish (*Betta splendens*) propagation efficiency during thirty days in a Randomize Totally Design with 4 repeats. Experimental plots had been consisted of twenty 30*30*40 (cm) aquarium which a pair of male and female brood stocks was introduced to each one. Male and female were separated in each plot by a glass plate for 15 days in order to prepare for spawning. The results of the experiment showed no significant differences on spawned ova, ova diameter, and hatched ova among various ration treatments ($p>0.05$), but the averages comparison of referring factors showed that spawned ova, hatched ova, and ova diameter, were better in those brood stocks that had been fed by blood worm food treatment. However, ordinary commercial food treatment resulted weakest averages through all ration treatments.

Keywords: *Artemia cyst; Artemia mass; blood worm; Gammarus mass; Siamese fighting fish*

INTRODUCTION

The siamese fighting fish for the special reason of itself, it is very interested in people who like animals. After some times, some of these persons think about increasing these fishes. But unfortunately, this effort doesn't consist all the biological aspects and doesn't approach success and the output is not noticeable. (Arjini, 2006) So, it is necessary to inform these people about living area conditions, preparation of spawning, mate finding, spawning time, birth time of eggs and etc. Of course, there were a lot of studies in many years ago about these fishes. For example, they could live in glass, but the proper dimensions of artificial living environment is 24 * 12 * 12. (Terceira, 2000) In different articles were talking about nourish of Siamese fish, and their favorite foods. But some researchers believe that live foods, are the best food for siamese fighting fish. (Parnell, 2006) This research tends to show the effect of food as a special factor of increasing this fish, to answering to some questions about this subject. The Major purpose of this project is to review current food rations in growing of aquarium fishes on spawning of siamese fighting fish.

MATERIALS AND METHODS

To perform this experiment, there are 5 foot treatments that include:

artemia cyst, artemia mass, blood worm, gammarus mass and current food of siamese fighting fish have been chosen with 4 repetitions or each of them. The tentative parts include 20 aquariums with 40 * 30 * 30 cm and there are 18 liter water in each aquarium (15 cm height).

At all of the time of this project, measuring of physicochemical factors for all of the treatments was done:

PH: 7/5

The air temperature: 30 – 35 °C

The water temperature: 26-28 °C

Total hardness: 108

Dissolved oxygen: 6 mg/lit

Inner rims of aquariums and other equipments in them such as aerators, etc.... were disinfected with salt without iodine. For disinfecting the fishes before introduce them to the aquariums, we used solution of Acrofelavin 5% in bath for 5 minutes. Then introduce a pair of healthy fish to any tentative parts. After that the fish were not fed for 24 hours. Then a glass screen

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was put between male and female fish in each aquarium and was fed them, according to diet, for a month in twice a day (at 9:00 am and 6:00 pm).

Method of measurement daily food was 3% weight of body fish (Dick, 2004).

When a male fish started to make a bubbling nest, at first a piece of thick plastic with an area about 10cm² was put in each male holding tank.

So the male fish made a bubbling nest under it. While these bubbles were 500 numbers, female fish was put near the male by removing the glass screen. About 24 hours after pairing the fishes, the male finished the nest, then invited the female to the nest for spawning. At this time the female was bred (about 5-10 number in each time) that was fertilized by male immediately. When the male saw the little eggs, collected all of them from his mouth and took them on top of water and put them between bubbles. A breeding dance was done between 3-5 minutes. The spawning was continued about 3 hours. After 1 or 2 hours of spawning, to prevent to damage of female fish, it was moved to another tank immediately. In all of the incubation time, temperature of the water was fixed about 27 °C. The temperature was controlled by a digital thermometer (VIPRO) with 0.1 °C minuteness. The diameter of eggs was measured by digital micrometer (Leitz, model 621). For this purpose, 10 eggs of each pair of spawner were selected randomly and the diameter of them was estimated. This project was done in a private farm with 50000 capacity production of fish per year. 3-4 days after spawning, all of the eggs hatched. After doing these experiments and collection of information, for studying significant differences between treatments was used for variance analysis of data (ANOVA) and for drawing graphs was used of Excel software. In this test also for indicating best food was used Duncan test for comparing averages, for doing variance analysis was used MSTST-C software.

RESULTS AND DISCUSSION

The middle of brood fish's length was between 4-6 cm and their weight were between 2.5 – 4 gr. The average of eggs diameter was about 1 millimeter. So, there isn't any significant difference between indicators in the table of result of variance analysis.

CONCLUSION

Siamese fighting fish eat different foods. These fishes usually find food among plants on top of the water

but when they are hungry, benthic little fishes are their food. The food of this fish is zooplanktons, larvas and insect eggs (Arjini, 2000). According to this research, this fish can be fed with dry live foods or fresh foods that fixed by the size of its mouth. Also Parnell (2006) said that the live food is the best food for siamese fighting fishes.

B. Hunt (2003) showed that favorite food for this fish is alive larva of water insects and he believed the best food for siamese fighting fish in the aquarium is freezing blood worm. Terceira (2000) has proposed suitable dimension of synthetic habitat for siamese fish is 24*12*12cm, but in this study these dimensions are 40*30*30cm. Sharpe (2007) believes that, the suitable temperature for this fish is 24-30 °C. Sogeke (2005) confirmed this temperature and said the best temperature is between 26-28 °C. In this project, according to Sharpe & Sogeke ideas, the temperature was 27 °C.

So it is observed in Table 2, Fs in time of fish spawning is 2.069, in number of counted eggs is 2.640, in number of counted larvas is 2.847 and at Percent of survival rate is 0.344. It is shown that there are not any significant difference by 5 type treatments in mentioned indicators. But, Duncan test showed that the results of a study about the effects of different factors on some indicators during 30 days (total period of the project) can introduce the best food treatment, and type of treatment effects on the time spawning of siamese fish, the number of eggs and larvas. In all of the factors, such as number of eggs, larva, ... blood worm has the highest grade (A) and commercial food has the lowest grade (C) (Table3). Considering of results in variance analysis and Duncan test showed the percent of unfertilized eggs were changed between 5% - 10%. Finally, efficiency of spawning were more than 90%.

So it was seen, in all of factors the best results were in blood worm, because the percent of protein in blood worm is high. So, these fishes like this food more than the others. Therefore the arrangement of foods according these values are: blood worm, Artemia cyst, Artemia mass, Gammarus mass, commercial food. Of course, by attention to the effect of each treatment of 1 and 3, combination of 2 treatments, blood worm & Artemia cyst, offered as the best food. Also, because of all of the food treatments had the results better than commercial food, so it suggests that the compound of this food was changed.

Table (1): Comparison between the results of Siamese fighting fish in different food treatments. ($P \geq 0.05$)

(Numbers are average)				
Percent of Survival rate	Number of larvae	Number of eggs	Spawning time (hours)	Type of treatments
92.9±4.554	219±24.253	235±20.155	192 ±19.595	Treatment 1 (blood worm)
90.86±1.757	186±12.556	205±15.628	264±43.817	Treatment 2 (Artemia mass)
93.6±5.162	203±26.839	212±29.859	240 ± 64.999	Treatment 3 (Artemia cyst)
92.9±3.459	185±18.083	199±20.139	264 ±60.398	Treatment 4 (Gammarus mass)
92.42±1.771	177±15.895	191±14.361	312±54	Treatment 5 (commercial food)

Table (2): The result of variance analysis in consideration factors during the experiment.

Ft	SUM	Sign of factors	Considerable indicator	Row
ns 2.069	2476.8	D.T.S	Spawning time (hours)	1
ns 2.640	10608.55	N.O.O	Number of counted eggs	2
ns 2.847	11010.95	N.O.L	Number of counted larvae	3
ns 0.344	229.57	S.R	Percent of survival rate	4

NS: There is' n t any significant difference.

D.T.S: Days to spawning

N.O.O: Number of ovules

N.O.L: Number of larva

S.R: Survival rate

Table (3): Results of Duncan test in several factors during the experiment.

Treatments					(Average) M, (score) R	Considerable indicator	Row
Commercial food 5	Glamorous mass 4	Artemia cyst 3	Artemia mass 2	Blood worm 1			
a 234	a 276	a 240	a 264	A 215	M & R R	Spawning time (hours)	1
c 145.3	b 199.8	ab 212.3	ab 205.8	a 235.8	M & R	Number of eggs	2
c 132.8	b 185.5	ab 203.5	b 186.5	a 219.3	M & R	Number of larvae	3
a 92.42	a 92.90	a 93.60	a 90.86	a 92.85	M & R	Percent of survival rate	4

The scores between A, C are: A> AB>B>BC>C

References:

Arjini, M., (2000). Aquarium (Model of the nature under the water). publication; Naghshe Mehr, Tehran. 13
 Arjini, M., (2006). Breeding, Culture & Keeping of ornamental fish.
 Dick, M.; Derek L., (2004). The Aquarium Fish Handbook .Grange books. 256p.
 Hunt, B., (2003). Caring Betta splendens. publication; Badmans Tropical fish, USA. 26 P.

Sharpe, S., (2007). Siamese fighting fish. A part of The NewYork Times company.Inc. publication; Negarnoor, Tehran, pages 31 – 39, pagea 119 - 140.
 Sogeke, B., (2005). Halfmoon Bettafish. http: Ezine Articles.com
 Parnell, V., (2006). Betta for Beginners .powered by Alfred web pulishing systems v3 by.
 Terceira, T., (2000). Breeding Betta fish. Master of sience in biological.

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