

## Larval rearing and fry raising of *Pangasius sutchi* (Fowler)

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### Abstract

*Pangasius sutchi* were artificially bred for determining the hatching success and larval growth response to live food in relation to varying stocking densities. The fertilized eggs were hatched out with successful hatching rates ranging between 60 and 63%. Newly hatched larvae of 4.4 mm average length were reared using *Tubifex* as live food in metallic trays with water temperature of 27 to 29.5°C and dissolved oxygen level of 3.88 to 6.22 mg/l for 6-day with an average survival rate of  $75.56 \pm 13.25\%$ . The *P. sutchi* fry of 9-day old were further reared using *Tubifex* in the polythene covered metallic trays at the stocking densities of 2-7 fry per litre of water for a period of 14 day. *P. sutchi* fry raising at 4 individual per litre of water for 14 day gives better results in terms of survival and growth.

Key words: Fry rearing, *Tubifex*, *Pangasius sutchi*

The Thai pangas, *Pangasius sutchi* is well known for its faster growth, high disease resistance with tolerance of a wide range of environmental parameters (Bardach *et al.* 1972, Stickney 1979). It has great advantage as a cultivable fish over other Clariid and Ictalurid catfishes because of its high consumer acceptance and lucrative price. The fish was introduced in Bangladesh from Thailand in 1990 and since then its farming is being popular. But its large-scale culture and intensification is seriously being handicapped because of inadequate supply of quality seed.

The experiment was carried out at the Aquaculture Laboratory of Bangladesh Agricultural University between July to August'98. The growth and survival of *P. sutchi* larvae were assessed under different stocking densities using *Tubifex* as a live food. The fertilized eggs were collected from the hatchery of Bangladesh Fisheries Research Institute, Mymensingh. The eggs were then transferred in the 6 polythene-covered metallic trays having a size of 0.027 m<sup>3</sup>. Prior to shifting of the eggs, all the trays were filled with 10 litre of water and then one hundred eggs were placed in each tray for hatching. Eggs were evenly distributed in the trays. The trays were treated with a 0.5ppm solution of KMnO<sub>4</sub> to protect the eggs from fungal infection. All the trays were provided with aeration facilities. About 50% of the water of all trays were changed after

every six-hour during the period of incubation. All dead eggs and waste products were immediately removed by siphoning. Hatching and survival rates were properly recorded. About 55 to 56-hour old larvae were supplied with minced *Tubifex* for 6-day. Physico-chemical parameters of tray water such as, dissolved oxygen and pH were recorded daily during this period through digital oxygen and pH meter, respectively. The water temperature was also recorded through the ordinary mercury Centigrade thermometer daily.

There were 6 treatments based on densities, each of which having 3 replicates. Nine-day old fry of *P. sutchi* were stocked at the densities of 2, 3, 4, 5, 6 and 7 individual per litre of water in the metallic trays having a volume of 0.027 m<sup>3</sup> in treatment 1, 2, 3, 4, 5, and 6, respectively. The fry had an initial average total length of 10.4 mm and weight of 4.4 mg. In each tray 10 litres of water was used. During the experimental period, the fry was fed up to the satiation level for 4 times daily. The minced *Tubifex* were spread homogeneously on the water surface of the trays. The fry was considered satiated when it stopped searching for food within about 5-minute of food supply. The trays were cleaned twice a day through siphoning before feeding. A portion of water in the tray was changed twice at the time of siphoning daily.

The growth rate of 10 fry in term of gain in length (mm) and weight (mg) was recorded at every 7 day interval through sampling. The specific growth rate, average daily gain, survival rate, and length-weight relationship were analysed. The mean hatching rate was found to be  $63.0 \pm 2.64$ . The average survival rate of post larvae of *P. sutchi* during 6 day of feeding trial with *Tubifex* was  $75.56 \pm 13.25\%$ . The data on effects of stocking densities on the growth and survival of *P. sutchi* fry up to 14-day of rearing trial are presented in Table 1.

Table 1. Comparison on length, weight, SGR and survival rates of *P. sutchi* fry

Treatment/ Stocking density/litre	Initial Length (mm)	Initial weight (mm)	Final length (mm)	Final weight (mg)	SGR	Survival rate (%)
T <sub>1</sub> (2)	10.4	4.4	23.9±1.21a*	81.6±2.7a*	0.2085a*	61.43a*
T <sub>2</sub> (3)	10.4	4.4	22.5±1.05ab	72.7±2.1b	0.2003ab	58.90ab
T <sub>3</sub> (4)	10.4	4.4	21.3±1.07ab	61.2±1.95c	0.1880b	57.83ab
T <sub>4</sub> (5)	10.4	4.4	19.7±1.10b	49.1±1.23d	0.1609c	51.15b
T <sub>5</sub> (6)	10.4	4.4	18.4±1.21b	39.5±1.57e	0.1567c	46.90bc
T <sub>6</sub> (7)	10.4	4.4	16.8±1.11c	26.0±1.33f	0.1268d	42.25c

\* Means followed by the same script (s) in the same column are not significantly different at 5% level of significance.

The best growth rate ( $P < 0.05$ ) was achieved in T<sub>1</sub> with a total length of  $23.9 \pm 1.21$ mm. Although the final total length of fry in T<sub>1</sub>, T<sub>2</sub>, and T<sub>3</sub> were statistically similar ( $p > 0.05$ ). The final total length of fry in T<sub>4</sub> and T<sub>5</sub> were found to be  $19.7 \pm 1.10$  and  $18.4 \pm 1.31$ mm ( $p > 0.05$ ), and finally T<sub>6</sub> averaged  $16.8 \pm 1.11$ mm showed minimum gain in length among all the treatments. The comparatively higher specific growth rates

were  $0.2085 \pm 0.031$  and  $0.2003 \pm 0.029$  in  $T_1$  and  $T_2$  (significantly better than the other treatments), respectively. Specific growth rate ( $0.1268 \pm 0.011$ ) was lowest in  $T_6$ . The highest survival rate was found in  $T_1$  ( $61.43 \pm 2.88\%$ ). Higher mortality rate of about 50-60% was encountered in  $T_4$ ,  $T_5$ , and  $T_6$ , which seems to be the effects of higher stocking density.

The range of water temperature ( $^{\circ}\text{C}$ ) was 27.5 to 29.4. The dissolved oxygen content ranged from 3.88 to 6.52 mg/l. The pH value fluctuated from 7.7 to 8.65. The water quality parameters were however, more or less similar ( $p > 0.05$ ) in all the treatments.

The survival rate of young fry up to 6-day of age was fairly high averaging  $75.56 \pm 13.25\%$ . Cent percent survival of *P. sutchi* was noted by Kamarudin *et al.* (1987) under controlled condition using a formulated diet supplemented with *Tubifex*. Survival as high as 86% was achieved in *C. batrachus* through feeding of chopped *Tubifex*. The differences in the survival rates of fry appears to be related with the food particle size of the chopped *Tubifex*, the frequency of feeding, the cleanliness of the culture facilities and the water quality.

The stocking densities had pronounced effects on the survival and growth of the fry up to 14 day of rearing. Islam (1998) observed a survival rate of 36-56% in *P. sutchi* by feeding artificial diet containing 40.25% protein. Okoye *et al.* (1991) reported the survival rate of 35.7-79.0% for *C. gariepinus* which were more or less closer to the survival rate found by Madu *et al.* (1989) for *C. angularis*. On the other hand, Polling *et al.* (1988) recorded the highest survival rate of 96% in *C. gariepinus* by feeding *Artemia* and zooplankton. The survival rate of *P. sutchi* in the present study varied from  $42.25 \pm 2.18$  to  $61.43 \pm 2.88\%$  which is similar to these reported by the above authors. Further, Mollah (1985) reported that lower stocking density promoted the larger size of *C. macrocephalus* fry and enhanced their survival rate. Survival rate of *C. macrocephalus* larvae was higher at the stocking densities of 2, 4 and 8 fish per litre of water as compared to 16 fish per litre (Mollah 1985). Similar phenomenon was also noted by Barua (1990) in case of *C. batrachus* and he recommended a stocking density of 4 fish per litre. Das *et al.* (1992) observed an inverse relationship between stocking densities and the growth performance in *C. batrachus*. Haylor (1992) demonstrated that larval age of African catfish were significantly affected by the initial stocking densities of 25 to 250 larvae per litre of water.

Comparison of treatment means by Duncan's New Multiple Range Test (DMRT) showed that the survival rate of fry at a stocking density of 2, 3, 4, and 5, individual per litre was significantly higher ( $p < 0.05$ ) than that of 6 and 7 per litre. It may be noted here that the survival rates of 2, 3, and 4 fish per litre did not vary significantly ( $p > 0.05$ ) from each other. Therefore, it may be recommended to raise *P. sutchi* fry at 4 fry per litre of water in the polythene-covered metallic trays.

Like survival rate, the growth rate in terms of average daily gain (ADG) and specific growth rate (SGR) were also significantly dependent on the stocking densities. Growth rates were much better at the stocking densities of 2, 3 and 4 fish per litre as compared to the stocking densities-of 5, 6 and 7 fry per litre. However, ADG and SGR did not show any significant variation when stocked at 2 to 4 individual per litre of water.

Thus, it may be concluded that *P. sutchi* fry raising at 4 individual per litre of water for a period of 14 day gives best results in terms of survival and growth, which appears in line with the recommendation of Mollah (1985) and Barua (1990) who determined the maximum effective stocking density of 4 fry per litre in *C. batrachus*.

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