The Bioscan 7 (3) : 553-556, 2012
AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES
www.thebioscan.in

GROWTH PERFORMANCE OF SNAKESKIN GOURAMI, *TRICHOGASTER PECTORALIS* (REGAN, 1910) THROUGH WEANING STRATEGIES

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KEY WORDS
Weaning
Fry
Trichogaster pectoralis
Formulated feed

Received on :
18.05.2012

Accepted on :
16.08.2012

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ABSTRACT

For successful venture in ornamental fish seed production proper nourishment at different life stages holds the key. Growth and survival of fry of snakeskin gourami, *Trichogaster pectoralis* by using mixed zooplankton and formulated feed was evaluated during this study. Fry of snakeskin gourami, *Trichogaster pectoralis* was weaned from mixed zooplankton to formulated feed. Snakeskin gourami, *Trichogaster pectoralis* fry (1.6 ± 0.06cm initial length and 0.39 ± 0.003g initial body weight) were fed with mixed zooplankton (T_1) and formulated feed (T_2), and combination of both live food and formulated feed in case of weaning treatments *i.e.* weaning at day 6 (T_3), the reduction in quantity of mixed zooplankton were performed at day 2, 4 and 6. Similarly for weaning treatment T_4 (weaning at day 12), these changes were made at day 6, 9 and 12 and for weaning treatment T_5 (weaning at day 24) at day 12, 18 and 24. The fish weaned at day 24 (T_5) had the highest average length gain and differed significantly ($p < 0.05$) from fry fed mixed zooplankton (T_1). In case of average weight gain, specific growth rate and survival fry weaned at day 24 were highest and differed significantly ($p < 0.05$) from fry fed mixed zooplankton (T_1), formulated feed (T_2) and combination of both live food and formulated feed (T_3 and T_4). This study showed that replacement of mixed zooplankton by formulated feed at day 24 *i.e.* late weaning appears feasible. The fry weaned at day 24 (T_5) showed significant increase in growth and survival from initial stocking *i.e.* 3.65 ± 0.13cm length, 0.85 ± 0.01g weight and 97.50 ± 2.50% survival respectively.

INTRODUCTION

The genus *Trichogaster* contains many of the more popular gouramis traded in the industry including the "Snakeskin Gourami". The Snakeskin gourami, *Trichogaster pectoralis* (Regan, 1910) is one of the most popular and colorful aquarium fish among the gouramis. They are timid, gentle and ideal for a community tank. They are native to the waters of Thailand (The Malayan Peninsula), Sumatra and Borneo (Axelrod, 1967).

Snakeskin gourami is a popular aquarium fish and fetches high price in the market. Research developments in larviculture and early rearing technology have allowed 90% of currently marketed freshwater ornamental fish to be cultured (Tlusty, 2002). However growth and survival of the young larvae is still one of the major concerns and hence growth and survival of the young should be enhanced through proper feeding regimes at appropriate life stages. The suitability of combinations of live food and formulated feed and the time at which the feeding of live food can be discontinued needs to be investigated (Kaiser *et al.,* 2003). Problems associated with the used of dry feed are an increase in size variation, a potential deterioration of water quality and lack of information about the best time and method to wean fish from live food to dry food. With the view of improving survival and growth of fry of snakeskin gourami weaning from live food to formulated feed was undertaken during the trial.

MATERIALS AND METHODS

The weaning experiment was conducted with five treatments *viz*, mixed zooplankton (T_1) served as a control diet, formulated feed (T_2), combination of mixed zooplankton and formulated feed for weaning the fry onto formulated feed at 6 days (T_3), 12 days (T_4), and 24 days (T_5). In case of weaning treatments for example weaning at day 6 (T_3), the reduction in quantity of mixed zooplankton were performed at day 2, 4 and 6. Similarly for weaning treatment T_4 (weaning at day 12), these changes were made at day 6, 9 and 12 and for weaning treatment T_5 (weaning at day 24) at day 12, 18 and 24. The numbers of mixed zooplankton were reduced to half of previous density at each reduction and feed was provided at the rate of 7% of the biomass (Degani and Gur, 1992). The glass tank containing five litres of freshwater was used to rear the fry for experimental duration of 30 days. The plastic containers were arranged as per Completely Randomized Design (CRD) with four replicates for each treatment. Fry of snakeskin gourami (average length 1.6 ± 0.06cm, average weight 0.39 ± 0.003g) were stocked in the experimental rearing containers at the rate of two numbers per litre. Formulated feed having 36% crude protein (Degani and Gur, 1992) was prepared. Uneaten food was siphoned out and nearly 40% of water from each container was exchanged daily. Water quality parameters such as temperature, pH, dissolved oxygen, free carbon dioxide, total alkalinity and total hardness were measured by following

standard methods given in APHA (2005) and Boyd (2009). After rearing period of 30 days, fry from each replicate were counted, length were measured by using metallic and calibrated foot rule having least count of 0.5mm and weight of fry was measured by using the mono-pan electric (Sartorius, BS 224S) balance having an accuracy of 0.01mg, maximum 220g and specific growth rate (%) was calculated. Survival was also calculated at the end of the experiment.

Data analysis

The growth parameters, such as length gain, weight gain, and Specific Growth Rate (SGR) and survival were calculated by using the following formulae (Hari and Kurup, 2003).

$$\text{Length gain (\%)} = \frac{\text{(Final length – Initial length)}}{\text{Initial length}} \times 100$$

$$\text{Weight gain (\%)} = \frac{\text{(Final weight – Initial weight)}}{\text{Initial weight}} \times 100$$

$$\text{Specific growth rate (\%)} = \frac{(\text{Log } W_t - \text{Log } W_o)}{Dt} \times 100$$

Where, W_t = Final weight, W_o = Initial weight and dt = Rearing period in days

$$\text{Survival (\%)} = \frac{\text{(Initial number of fish – Final number of fish)}}{\text{Initial number of fish}} \times 100$$

RESULTS

The proximate composition of formulated feed used throughout the trial is reported in Table 1. The gross energy content of the formulated feed 16.43 ± 0.05 kJ/g.

The fish weaned at day 24 (T_5) had the highest average length gain (Fig. 1), weight gain (Fig. 2), specific growth rate (Fig. 3) and survival (Fig. 4). Length gain of fry differed significantly ($p < 0.05$) from fry fed mixed zooplankton (T_1) whereas weight gain, specific growth rate and survival of fry of snakeskin gourami differed significantly ($p < 0.05$) from fry fed mixed zooplankton (T_1), formulated feed (T_2) and combination of both live food and formulated feed (T_3 and T_4). The average length gain, weight gain, specific growth rate and survival is shown in Table 2.

Table 1: Proximate composition (% dry weight basis) of formulated feed

Proximate composition	Percentage
Crude protein	36.30 ± 0.10
Crude fat	9.40 ± 0.10
Crude fibre	4.55 ± 0.05
Moisture	12.00 ± 0.10
Total ash	14.45 ± 0.05
Nitrogen free extract (NFE)	23.30 ± 0.20
GE (kJ/g)	16.43 ± 0.05

NFE = Nitrogen free extract is calculated by difference; GE = Gross energy is calculated based on 0.17, 0.40 and 0.24 kJ/g for carbohydrate, lipid and protein respectively; Values expressed as % dry weight, ± S.E: Standard error of mean; n = 3

The initial length and weight of fry of *Trichogaster pectoralis* was 1.6 ± 0.06 cm and 0.39 ± 0.003g and stocking rate of 10 nos. of fry for all the treatments viz. T_1, T_2, T_3, T_4 and T_5 respectively. The significance of changes from T_1 to T_5 as shown in Table 2 was evaluated by following the statistical methods given by Snedecor and Cochran (1967), Zar (2004). The highest significant changes in growth and survival was observed in T_5 (fry weaned at day 24) and the increase in length was upto 3.65 ± 0.13cm, weight 0.85 ± 0.01g and 97.50 ± 2.50% survival which was significant from the rest of the treatments T_1, T_2, T_3 and T_4.

DISCUSSION

Snakeskin gourami, *Trichogaster pectoralis* fry weaned at 24 days resulted in maximum length gain (128.12%), weight gain (116.15%), specific growth rate (2.57%) and 97.50 % survival and it was significantly higher ($p < 0.05$) from live feed viz. mixed zooplankton. However, a early weaning (in 6 days) resulted in slower growth and survival. It was found that the fry of lemon tetra, *Hyphessobrycon pulchripinnis* and serpae tetra, *Hyphessobrycon serape*, can be weaned after the initial three weeks from live food to formulated diet which were found similar during the present study for weaning fry of *T. pectoralis* at day 24, *i.e.* after three weeks (Cole and Haring, 1999). Herbert and Graham (2003) observed that gradual weaning process had higher survival than (78%) abrupt weaning in fingerlings of golden perch, *Macquaria ambigua ambigua*. In the present study it was observed that gradual weaning at day 24 resulted in 97.50% survival. Khemis *et al.* (2003) studied the early weaning of winter flounder, (*Pseudopleuronectes americanus*, Walabaum) larvae on a commercial microencapsulated diet. The present study revealed similar weaning strategies at development stage of 1.6cm in accord with Khemis *et al.* (2003). Sanaye (2007) observed that fry of neon tetra, *Paracheirodon innesi* can be weaned from mixed zooplankton to formulated feed. The study revealed that fry of *P. innesi* weaned at day 6 (early weaning) resulted in better growth and survival. In the present study late weaning of fry of *T. pectoralis* resulted in better

Table 2: Average length gain, weight gain, specific growth rate and survival of fry of *T. pectoralis* under the different weaning strategies

Parameters	Weaning strategies				
	T_1	T_2	T_3	T_4	T_5
Average Initial length (cm)	1.6 ± 0.06	1.6 ± 0.06	1.6 ± 0.06	1.6 ± 0.06	1.6 ± 0.06
Average Initial weight (g)	0.39 ± 0.003	0.39 ± 0.003	0.39 ± 0.003	0.39 ± 0.003	0.39 ± 0.003
Initial no. of fry stocked	10	10	10	10	10
Average Final length (cm)	2.40 ± 0.13	3.13 ± 0.11	3.23 ± 0.09	3.40 ± 0.09	3.65 ± 0.13
Average Final weight (g)	0.49 ± 0.01	0.57 ± 0.02	0.53 ± 0.01	0.70 ± 0.05	0.85 ± 0.01
Final no. of fry survived	8.00 ± 0.41	8.75 ± 0.63	7.50 ± 0.65	7.75 ± 0.25	9.75 ± 0.25
Average length gain (%)	50.00 ± 8.07	95.31 ± 6.93	101.56 ± 5.34	112.50 ± 5.71	128.12 ± 8.27
Averageweight gain (%)	23.60 ± 3.17	45.15 ± 5.42	34.38 ± 3.27	76.21 ± 12.53	116.15 ± 3.49
SGR (%)	0.70 ± 0.08	1.24 ± 0.13	0.98 ± 0.08	1.86 ± 0.24	2.57 ± 0.05
Survival (%)	80.00 ± 4.08	87.50 ± 6.29	75.00 ± 6.45	77.50 ± 2.50	97.50 ± 2.50

*Values expressed as ± S.E. of mean.

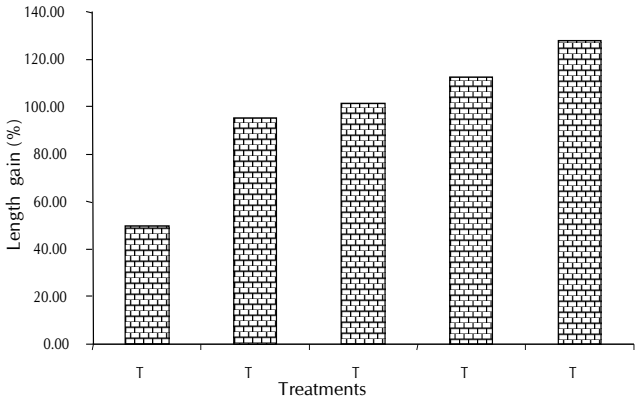

Figure 1: Average length gain of *T. pectoralis* fry during weaning for 30 days

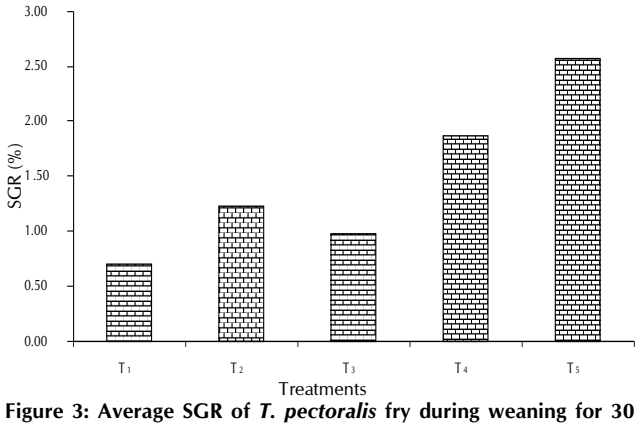

Figure 3: Average SGR of *T. pectoralis* fry during weaning for 30 days

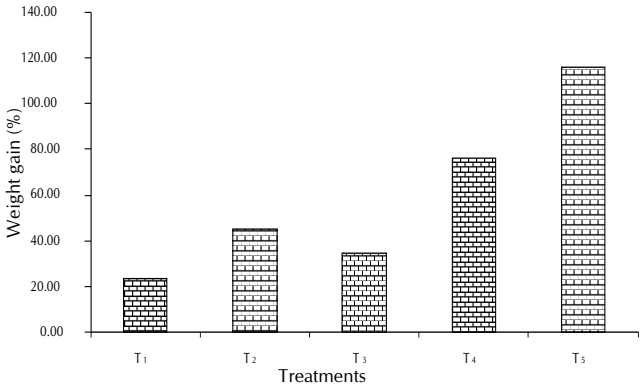

Figure 2: Average weight gain of *T. pectoralis* fry during weaning for 30 days

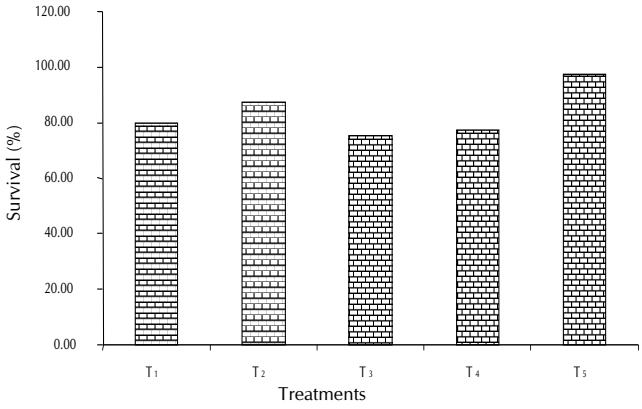

Figure 3: Average survival of *T. pectoralis* fry during weaning for 30 days

growth and survival. This is due to the mouth ingestion capacity and size of the fry at that particular stage. Other works in accord with the present study are Duray and Bagarinao (1984) who reported that by gradual weaning even younger milk- fish larvae using formulated diets resulted in better growth and survival. Szalminska and Przybyl (1985) revealed that zooplankton can be replaced with dry feed *C. carpio* with better growth and survival. Morioka *et al*. (2010) reported better growth and development of body organs through gradual changes in feeding habits by changing the diets. Gordon *et al*. (1998) reported that the optimum time to wean *A. percula* on to a dry formulated feed was between 15 to 20 DAH with no reduction in growth and survival. Thus, from the present study it can be concluded that late weaning of fry of *T. pectoralis* is feasible in terms of growth and survival.

ACKNOWLEDGEMENT

The Authors wish to thank authorities of College of Fisheries, Dr. BSKKV, Dapoli, Ratnagiri, Maharashtra, India for assisting in conducting the experiment.

REFERENCES

AOAC. 2006. Official Methods of Analysis. 18th Ed. *Association of Official Analytical Chemist, Washington, D.C.*

APHA. 2005. Standard methods for the examination of Water and Waste water, 21st Ed. American Public Health Association, American Water Works Association. *Water Environment Federation, Washington DC, USA.*

Axelrod, H. R. 1967. Breeding Aquarium Fishes Book I, T.F.H. Publications, USA.

Boyd, C. E. and Tucker, C. S. 2009. Pond Aquaculture Water Quality Management, 9th Ed. Springer (India) Private Limited Publications, New Delhi, India.

Cole, B. and Herring, M. 1999. Spawning and production of the Serpae tetra, *Hyphessobrycon serape*. *Center for Tropical and Subtropical Aquaculture*. 138.

Degani, G. and Gur, N. 1992. Growth of juvenile *Trichogaster leerii* (Bleeker, 1852) on diets with various protein levels. *Aquaculture Research*. **23:** 161-166.

Duray, M. and Bagrinao, T. 1984. Weaning of hatchery breed milkfish larvae from live food to artificial diets. *Aquaculture*. **41:** 325-332.

Gordon, A. K., Kaiser, H., Britz, P. J. and Hecht, T. 1998. Effect of feed type and age at weaning on growth and survival of clownfish *Amphiprion percula* (Pomacentridae). *Aquarium Sciences and Conservation*. 215-226.

Hari, B. and Kurup, M. 2003. Comparitive evaluation of dietary protein levels and plant animal ratios in *Macrobrachium rosenbergii* (De Mann). *Aquaculture Nutrition*. **9:** 131-137.

Herbert, B. and Graham, P. 2003. Use of Artemia, Frozen zooplankton and artificial food for weaning fingerlings of the freshwater Golden perch *Macquaria ambigua ambigua* (Percichthydae). *Asian Fisheries Science*. **16:** 85-90.

Kaiser, H., Endemann, F. and Paulet, T. G. 2003. A comparison of artificial and natural foods and their combinations in the rearing of

goldfish, *Carassius auratus* (L). *Aquaculture Research*. **34:** 943-950.

Khemis, I. B., Audet, C., Frunier, R. and Delanoue, J. 2003. Early weaning of winter flounder (*Pseutopleuronectes americalus*, Walbaum) larvae on a commercial micro encapsulated diet. *Aquaculture Research*. **34:** 445-452.

Morioka, S., Ito, S. and Kitamura, S. 2010. Growth and morphological development of laboratory reared larval and juvenile snakeskin gourami, *Trichogaster pectoralis*. *Ichthyological Research*. **57(1):** 24 – 31.

Regan, 1910. In: Breeding Aquarium Fishes Book II, T.F.H. Publications, USA.

Sanaye, S. V. 2007. Studies on growth and survival of spawn and fry of neon tetra *Paracheirdon innesi* (Myers, 1936). M.F.Sc. Thesis, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth (Agricultural University), Dapoli, India.

Snedecor, G. W. and Cochran, W. G. 1967. Statistical methods, 6th Ed. *Oxford and IBH publishing Co.,* New Delhi. India.

Szlaminska, M. and Przybyl, A. 1985. Feeding of carp (*Cyprinus carpio*) larvae with an artificial dry feed, living zooplankton and mixed food. *Aquaculture*. **54:** 77-82.

Tlusty, M. 2002. The benefits and risks of aquacultural production for the aquarium trade. *Aquaculture* **205:** 203-219.

Zar, J. H. 2004. Biostatistical Analysis, 4th Ed, Tan prints (I) Pvt. Ltd., Delhi, India.