Effect of three different feeds on the growth and survival of sailfin molly *Poecilia latipinna* (Lesueur, 1821)

A.K. Sultan Mohideen, M. Asrar Sheriff and K. Altaff
The New College, Chennai, India.

Abstract
The commercial value of ornamental fish is mainly dependent on fast growth and external body colouration. A study was conducted to evaluate the efficacy of three types of feed (Pellet feed, Groundnut oil cake and Dry *Tubifex*) in the rearing of Sailfin molly. Survival and growth parameters such as length, weight and specific growth rate (SGR) of the fish were determined to evaluate the performance of the feeds. Results showed that Sailfin molly performed better in terms of survival (100%) and SGR (2.8±0.01%) when fed with Dry *Tubifex* compared to the other feeds. Thus, Dry *Tubifex* proved to be the best feed for Sailfin molly for increasing the growth and survival of the fish, and has tremendous significance in the ornamental fish industry.

Keywords: Ornamental fish, Sailfin molly, Feed, Survival, Growth, SGR.

Introduction
Ornamental fish keeping is a popular, easy and stress relieving hobby and enterprise. Today, estimates put global trade in ornamental fishes worth about 6 billion (Venkataramani 2010) and India’s share in the global trade is USD 27,031 (Dash and Sahoo 2009). Thus an expanding domestic and world market together with availability of low-cost technology for ornamental fish production makes it a promising venture.

Among all categories of ornamental fishes, the live-bearing category is very popular because they are brightly coloured, accept all kinds of food and breed prolifically to produce living free swimming young ones. The live bearing species such as guppies (*Poecilia reticulata*), mollies (*Poecilia latipinna, Poecilia sphenops*), swordtails (*Xiphophorus helleri*) and platies (*Xiphophorus maculatus*) are a popular group being produced in Singapore, Malaysia, Indonesia, Thailand, India and China (Chapman et al.1997). The sailfin molly, *Poecilia latipinna* is widely distributed around the world as a protein source (food) and also serves as biological control for insects (Al-Ghanim 2005).

The natural diet of this species has been studied only in introduced Asian populations, and there is only one investigation pertaining to its feeding behavior (Green et al. 1976). Feeding and palatability trials using commercial feeds suggest that very little is understood about the nutritional requirements of the
Statistical Analysis

The data obtained from the experiment were subjected to one-way analysis of variance (ANOVA) using SPSS Version 10.0 programme to find the efficacy between the three types of feed. ANOVA revealed significant differences among groups and hence multiple comparison tests were performed among the means using Tukey’s test. Statistically significant differences were determined by setting the aggregate type I error at 5% \( p<0.05 \).

Results

The water quality parameters such as temperature, dissolved oxygen, and \( \text{pH} \) were found to be 29±2 degree C, 6.13±3.3 mg/l and 7-8 respectively.

Mean length and mean weight, SGR and survival of sailfin molly showed a statistically significant difference between the three groups (Table 2). It is evident that among the three diets, Group C (Dry \( \text{Tubifex} \)) showed the highest crude protein and lipid content. The sailfin molly, \textit{Poecilia latipinna} fed on Group C (Dry \( \text{Tubifex} \)) showed a rapid growth and attained the highest final mean length and mean weight when compared to those which were offered with Group B (Groundnut oil cake) and Group A (Control). Analysis of One-way ANOVA for mean length and mean weight, SGR and survival of sailfin molly showed a statistically significant difference between the three groups (Table 2). Final mean length (cm) was found to be highest in Group C (3.33±0.02) followed by Group C (3.25±0.01) and Group A (3.17±0.00). The results of mean length revealed significant difference between Group C (3.33±0.02) and Group A (3.17±0.00), \( p<0.05 \). However, there was not much difference between Group C (3.33±0.02) and Group B (3.25±0.01) \( p>0.05 \).

Table 1: Proximate composition of the experimental diets

<table>
<thead>
<tr>
<th>Composition</th>
<th>Group A Pellet feed (Control)</th>
<th>Group B Groundnut oil Cake</th>
<th>Group C Dry Tubifex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Protein (g Kg(^{-1}))</td>
<td>35 %</td>
<td>38 %</td>
<td>52 %</td>
</tr>
<tr>
<td>Crude Lipid (g Kg(^{-1}))</td>
<td>5 %</td>
<td>1 %</td>
<td>7 %</td>
</tr>
<tr>
<td>Crude Fibre (g Kg(^{-1}))</td>
<td>6 %</td>
<td>7 %</td>
<td>8 %</td>
</tr>
<tr>
<td>Ash (g Kg(^{-1}))</td>
<td>9 %</td>
<td>5 %</td>
<td>7 %</td>
</tr>
<tr>
<td>Moisture</td>
<td>10 %</td>
<td>10 %</td>
<td>8 %</td>
</tr>
</tbody>
</table>
Table 2: Growth Performance and survival rate of *Poecilia latipinna* fed with four different experimental diets. Values (Mean±SD) with different superscripts in the same row are significantly different at the 5% level.

<table>
<thead>
<tr>
<th>Growth Performance</th>
<th>Group A Pellet feed (Control)</th>
<th>Group B Groundnut oil cake</th>
<th>Group C Dry Tubifex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Length (cm)</td>
<td>1.95±0.02</td>
<td>1.95±0.02</td>
<td>1.95±0.02</td>
</tr>
<tr>
<td>Final Length (cm)</td>
<td>3.17±0.00(^{eb})</td>
<td>3.25±0.01(^{ac})</td>
<td>3.33±0.02(^{ab})</td>
</tr>
<tr>
<td>Initial Weight (g)</td>
<td>0.11±0.01</td>
<td>0.11±0.01</td>
<td>0.11±0.01</td>
</tr>
<tr>
<td>Final Weight (g)</td>
<td>0.63±0.00(^{eb})</td>
<td>0.83±0.00(^{ac})</td>
<td>0.95±0.01(^{ab})</td>
</tr>
<tr>
<td>SGR (%)</td>
<td>1.73±0.00e</td>
<td>2.4±0.01(^{a})</td>
<td>2.8±0.01(^{b})</td>
</tr>
<tr>
<td>Survival (%)</td>
<td>97±0.57(^{eb})</td>
<td>93±0.57(^{ab})</td>
<td>100±0.00(^{ac})</td>
</tr>
</tbody>
</table>

Final mean weight (g) was found to be higher in Group C (0.95±0.01) when compared to Group B (0.83±0.00) and Group A (0.63±0.00) (Figure 2). The results of mean weight showed significant differences between Group C (0.95±0.01) and Group A (0.63±0.00) (p<0.05). Thus the final mean length and mean weight showed an increased body length and weight in all dietary treatment groups.

In the present study, higher SGR (%) value was observed in Group C showing an average of 2.8±0.01, followed by Group B (2.4±0.01) and Group A (1.73±0.00).

The mean survival rate of sailfin mollies fed with three different diets during the experimental period ranged from 93% to 100%. The results indicated highest mean survivability for Group C followed by Group A (97%) and Group B (93%).

**Discussion**

In the present study, results indicated enhanced growth performance of *P. latipinna* when fed with Group C (Dry Tubifex). Similar results of higher growth performance of fish fed with Dried Tubifex have been reported earlier by Mandal *et al.* (2010). This could be due to the high crude protein content (52%), feed acceptability and palatability, improved food intake and other factors which are responsible for higher growth rate and survival. According to Kruger *et al.* (2001) better growth performance in the ornamental fish, *Xipholphorus helleri* was attained when the diet contains at least 45% crude protein and 6% lipid level. Shim and Bajrai (1962) reported that 70% crude protein was found to be suitable food for the fry of *Poecilia reticulata*. Dahlgren (1980) also reported that the guppy, *Poecilia reticulata* being omnivorous requires around 40% dietary protein.

Lower growth performance was observed in Group A (commercial pellet feed-control). Many hypotheses have been put forth to explain about the low performance of the dry diet as food for fishes. Goldblatt *et al.* (1979) reported that pelleted feeds lose vital nutrients like water soluble vitamins and amino acids within a short duration of exposure to water. Bergot (1986) substantiated that artificial feed changes the relationship between the animal and its environment.

In the present study when fish were offered with Group B (Groundnut oil cake) showed lesser growth rate when compared to Group C. Probably, this might be due to decreased level of protein content and absence of essential amino acids (Mohanty and Swamy 1986). Further, Maynard (1947) reported that high percentage of carbohydrate in groundnut oil cake reduces the digestibility. Hence, all these causes may be responsible for the poor performance in Group B.

Specific Growth Rate (SGR) was found to be highest when fed with Group C. Therefore, 52% protein diet is considered to be economical and optimal for rearing *Poecilia latipinna*. Similar findings have been reported by Shim and Chua (1986), with a crude protein level of 71%.

*T.tubifex* is the main constituent of ‘Tubifex’ worms sold as live food at pet shops, principally for aquarium fishes. *Tubifex* has long been known to enhance growth and reproduction in some aquarium fishes (Shim 1986). It was also found that the SGR of the fish that fed with dry *Tubifex* feed ensured better growth rate in the Sailfin molly compared to the other two feeds. Survival was also significantly affected by feed. It was higher in Group C followed by Group A and Group B.

**Conclusion**

Results of this study have shown that the growth performance and survival of *P. latipinna* can be enhanced by feeding with Group C (Dry Tubifex) commercial diet. However, detailed studies on the nutritional requirements of *P. latipinna* are essential for maximum growth and survival which will provide a range of nutrients to ensure consistent growth. This study has significance and implications in ornamental fish trade.

**References**

Effect of three different feeds on the growth and survival of sailfin molly Poecilia latipinna (Lesueur, 1821)/AK Sultan Mohideen


**Article history**

Received : 08/08/2013
Accepted : 24/06/2014