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Effect of Eri Moult as food on the growth and health of Blue Gourami (*Trichopodus trichopterus*)

Harshada P Chavan*, Sayali R Waghamare, Snehal A Bhosale
Department of Zoology, Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur, Maharashtra, India

Abstract
The present study evaluates the effect of direct Eri silkworm moult (cast-off larval skin) as a natural feed on the growth and health of Blue Gourami (*Trichopodus trichopterus*). Eri moult, which contains residual proteins, chitin and essential micronutrients, is traditionally discarded but may serve as a cost-effective and sustainable feed source for fish. In this experiment, Blue Gourami fingerlings were provided with direct, unprocessed Eri moult along with a standard basal diet, and their performance was compared with a control group receiving only commercial feed. Key growth indicators such as weight gain, length increment was monitored throughout the study. Health parameters including survival rate, external appearance, coloration, activity level and fin condition were also assessed. The results showed that the inclusion of direct Eri moult enhanced growth performance and improved feed utilisation efficiency. Fish fed with direct moult displayed better pigmentation, higher activity and overall improved vitality, suggesting positive effects on their general health and immunity. The study concludes that direct Eri moult can be effectively used as a natural supplementary feed for Blue Gourami, providing an eco-friendly and economical alternative for sustainable ornamental fish culture.

Keywords: Blue Gourami, Eri Moult, Ornamental Fish, Freshwater, Aquarium

Introduction

Aquaculture is an important sector in India, providing livelihood, nutrition and economic support to a large population. In recent years, the ornamental fish industry has gained considerable popularity due to increasing interest in aquarium keeping and commercial breeding. For successful ornamental fish culture, the quality of feed plays a vital role, as it directly influences the growth, colouration, immunity and overall health of the fish. The Blue Gourami (*Trichopodus trichopterus*) is one of the commonly reared ornamental fishes in India, known for its attractive appearance, hardy nature and ability to adapt well to captive conditions. To maintain good growth and health, this species requires a balanced and nutritious diet.

Blue Gourami (*Trichopodus trichopterus*) is one of the most popular ornamental fishes cultured in India as well as in many other countries. It belongs to the family Osphronemidae and is commonly called the Three-spot Gourami because of the two dark spots on its body and the eye which looks like the third spot. This fish is admired for its attractive blue colour, peaceful nature and ability to survive in a wide range of environmental conditions.

Most commercial fish feeds available in the market are costly, and their use becomes difficult for small-scale farmers or hobbyists. This has encouraged researchers to look for alternative natural feed sources that are affordable, easily available and environmentally sustainable. One such material is the eri silkworm moult. During their growth, Eri silkworms (*Samia ricini*) shed their exoskeleton several times, producing cast-off skins known as “Eri moult.” In the sericulture industry, this moult is usually treated as waste, even though it contains residual proteins, chitin, lipids and important minerals that can support fish nutrition.

Blue Gourami is an omnivorous fish and can utilise different types of natural feed. Adding eri moult to its diet may improve growth performance, feed utilisation and body colour due to the presence of chitin and other nutrients. Health parameters such as survival rate, fin condition, behaviour and colour intensity can provide a clear understanding of the overall effect of eri moult on fish well-being.

Since scientific studies on this topic are very few, there is a need to evaluate the direct feeding of eri silkworm moult on Blue Gourami. The present study aims to assess the effect of eri moult on growth parameters such as weight gain, length increment, along with health indicators like pigmentation and survival. The outcome of this research can help in promoting eri moult as a low-cost, sustainable and practical supplementary feed for ornamental fish culture in India.

Material and method

1. Aquarium Tank Dimensions:10X10 inches
2. Species Used: Blue Gourami (*Trichopodus trichopterus*)
3. Aquarium Equipment: Fishnet, water filter, thermometer, and a water testing kit
4. Chemical Treatments: White anti-chlorine liquid for dechlorination
5. Fish Diet: Commercial fish food and Eri moult.

Experimental Design

1. Selection and Acclimatization of Fish

- A glass aquarium was filled with 20 liters of dechlorinated water.
- Six Blue Gouramis were introduced and acclimated over a one- week period.
- Fish were initially fed commercial fish food to adapt them to the environment.

2. Growth Measurement

- Fish length and weight were recorded using precision measuring tools.

3. Feeding Experiment with Animal- Based Feeds

- Eri Silkworm Moult (Samia ricini) was selected as an experimental feed.

- A treatment group of five fish was fed Eri Moult instars twice daily.
- The control group was fed commercial fish food.
- 50mg of feed was introduced per feeding session.

4. Physico- Chemical Water Parameter Monitoring

- Temperature, pH, and dissolved oxygen levels were regularly measured using standard protocols (Winkler, 1888).

Aquarium Care and Maintenance

Water Parameters: The optimal temperature range for Blue Gourami is 24-28°C (75-82°F), with a slightly acidic to neutral pH of 6.0-7.5. Regular water changes of 25-30% per week are recommended to maintain water quality.

Dietary Requirements: Feeding should be conducted twice daily, providing only an amount that can be consumed within a few minutes to prevent overfeeding.

The present study aimed to evaluate the impact of Eri silkworm (*Samia ricini*) instars as a dietary supplement on the growth performance of Gourami fish cultured under controlled conditions. Over the course of the experiment, fish in the treatment group that received Eri silkworm instars twice daily demonstrated a notable increase in both length and weight compared to the control group, which was fed a standard diet of 50mg of commercial fish feed per session. These findings suggest that Eri silkworms may serve as an effective alternative or supplement to conventional fish feed, likely due to their high protein content and favorable amino acid profile.

The results are in alignment with previous research conducted by R. K. Gokula Krishna, where Eri silkworm pupae meal significantly enhanced the growth performance of common carp (Cyprinus carpio). Similarly, the findings of M. Shakoori and H. Ghlipoar demonstrated the efficacy of substituting fish meal with varying quantities of silkworm pupae in the diet of rainbow trout (Oncorhynchus mykiss), indicating a broader applicability of insect-based protein sources across multiple aquaculture species.

It is worth noting that in the current study, water quality parameters such as temperature, pH, and dissolved oxygen (DO) were regularly monitored and maintained within optimal ranges, ensuring that environmental factors did not confound the observed growth differences. This controlled setup further supports the hypothesis that the enhanced growth in the treatment group was attributable to the nutritional benefits of the Eri silkworm diet.

The improved growth performance in the treatment group highlights the potential of Eri silkworms as a sustainable and cost- effective protein source in aquaculture. Given the growing interest in reducing reliance on traditional fish meal—often associated with high costs and environmental concerns—insect-based feed alternatives offer a promising solution.

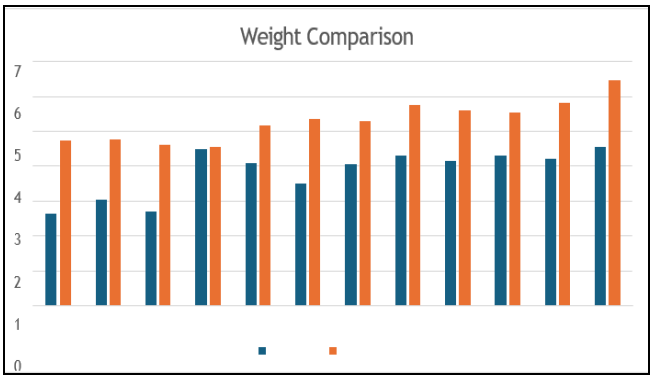
Furthermore, the use of silkworm by-products aligns with circular economy principles, promoting resource efficiency and waste minimization.

Future research should focus on optimizing the feeding rates and processing methods for Eri silkworms to maximize nutrient bioavailability. Long-term studies and the effects on fish health, reproductive performance, and consumer acceptability of fish fed insect-based diets would also be valuable.

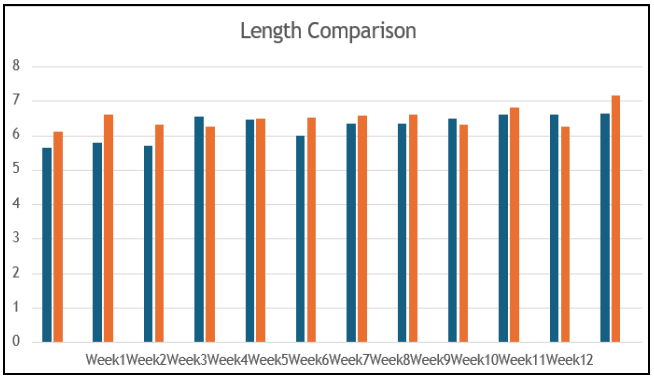
Results and discussion

Table 1: Weight and Length observations of Control and Treatment Group

Sr. No.	Date	Control		Treatment	
		Weight	Length	Weight	Length
1	13/1/2025	2.3m	5.3cm	4gm	6.5cm
		3gm	6.cm	5gm	5.5cm
				5gm	6.3cm
				5gm	6.2cm
2	21/1/2025	3gm	5.5cm	4gm	7cm
		3.1gm	6. 1cm	5gm	7cm
				5gm	6.2cm
				5.1gm	6.3cm
3	29/1/2025	2.4gm	5.3cm	4gm	7cm
		3gm	6cm	5gm	6.3cm
				5gm	6.2cm
				4.5gm	5.8cm
4	6/2/2025	4.32gm	6.2cm	4.3gm	6.1cm
		4.68gm	6.9cm	5.1gm	6.9cm
				4.46gm	7cm
				4.32gm	6.1cm
5	14/2/2025	4gm	6 cm	4.4gm	5.9cm
		4.2gm	6.9cm	5.3gm	6.5cm
				5gm	6cm
				6gm	7.6cm
6	22/2/2025	4gm	6cm	5.4gm	6cm
		3gm	6cm	4.5gm	6.5cm
				6gm	7.6cm
				5.5gm	6cm
7	2/3/2025	4 gm	6.7cm	4.1gm	6.1cm
		4.1gm	6cm	5.5gm	6.2cm
				6gm	7.7cm
				5.6gm	6.3cm
8	10/3/2025	4.4gm	6.7cm	5.5gm	6.4cm
		4.2gm	6cm	6gm	6.4cm
				5.5gm	6cm
				6gm	7.7cm
9	18/3/2025	4gm	6.8cm	5.5gm	6.1cm
		4.3gm	6.1cm	5.2gm	6.2cm
				6.1gm	6.5cm
				5.6gm	6.5cm
10	26/3/2025	4.2gm	6.8cm	5.7gm	6.3cm
		4.4gm	62cm	6gm	7.7cm
				5.4gm	6.7cm
				5.1gm	6.6cm
11	3/3/2025	4gm	6.8cm	5.2gm	6.3cm
		4.4gm	6.4cm	5.4gm	6.1cm
				6.2gm	6.2cm
				6.5gm	6.5cm
12	11/3/2025	4.6gm	6.7cm	5.8gm	6.5cm
		4.5gm	6.6cm	6.4gm	6.6cm
				6.9gm	7.8cm
				6.8gm	7.7cm



Graph 2: Comparison of Weight (Control vs. Treatment)



Graph 3: Comparison of Length (Control vs. Treatment)

Weight Measurement

Length Measurement

Gourami fish in Tank

Treatment Group given Eri moult

Measurement of control group length

pH Measurement

Control Group

Temperature Measure

Measurement of Treatment Group

Conclusion

The present study demonstrated that Eri silkworm moult (Samia ricini), when used as a supplementary natural feed, positively influences the growth and health of Blue Gourami (Trichogaster trichopterus). Fish in the treatment group fed with direct Eri moult showed noticeably higher weight gain, greater length increment and improved overall vitality compared to the control group receiving only commercial feed. Enhanced pigmentation, active behaviour and better fin condition observed in the treated fish further indicate the beneficial nutritional and physiological effects of Eri moult.

The results suggest that Eri moult, which is an easily available and low-cost by-product of the sericulture industry, can serve as an effective and eco-friendly alternative feed source for ornamental fish culture. Its use supports sustainable aquaculture practices by reducing feed costs and minimizing organic waste. Therefore, Eri moult can be recommended as a practical supplementary diet for Blue Gourami and potentially other freshwater ornamental fish species.

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