

**VOLUME 11    ISSUE 2    2025**

**ISSN 2454 – 3055**



**INTERNATIONAL  
JOURNAL OF  
ZOOLOGICAL  
INVESTIGATIONS**

***Forum for Biological and  
Environmental Sciences***

**Published by Saran Publications, India**



## **Monoculture of Indigenous Freshwater Fish Species *Puntius sophore* and its Cost Benefit Analysis**

**Sivakami R.<sup>1\*</sup>, Babu V.<sup>2</sup>, Vaidehi J.<sup>3</sup> and Rajendiran A.<sup>1</sup>**

<sup>1</sup>P.G. and Research Department of Zoology, Arignar Anna Government Arts College (Affiliated to Bharatidasan University) Musiri 621 211, Thiruchirappalli, India

<sup>2</sup>Mangalam College Arts and Science (Affiliated to the University of Madras) Thirumullaivoyal, Chennai, Tamil Nadu 600062, India

<sup>3</sup>Department of Zoology, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu 608002, India

*\*Corresponding Author*

**Received:** 27<sup>th</sup> November, 2025; **Accepted:** 19<sup>th</sup> December, 2025; **Published online:** 26<sup>th</sup> December, 2025

<https://doi.org/10.33745/ijzi.2025.v11i02.123>

**Abstract:** With the global population projected to reach 9 billion by the middle of the century and challenges such as climate change and environmental degradation threatening food security, aquaculture is expected to play a pivotal role in ensuring sustainable food production on a global scale. In this context, the present study was conducted in a perennial pond in Swamimalai, located in Thanjavur District, Tamil Nadu, India. The economics and cost benefit analysis of monoculture of *Puntius sophore* disclose that a total of 159.755 kg of fish was harvested and sold under two categories during the study period (January to March 2025). Big sized fishes weighing 122.15 kg were sold at Rs. 200/kg which amounted to Rs.24,430 and the smaller sized fishes weighing 34.6 kg were sold at Rs.150/kg which generated Rs.5,190. Thus, on the whole, the income generated was 29,620. The expenditure incurred for the entire culture amounted to Rs.13,100. Thus, on the whole, the profit worked out as Rs.16,520. The results of the present study clearly suggests that with proper management, raising of healthy and economically viable indigenous natural fresh water nutritional fishes can be achieved by following proper stocking density and advices from aquaculture specialists.

**Keywords:** Freshwater pond, Monoculture, *Puntius sophore*, Cost benefit analysis

**Citation:** Sivakami R., Babu V., Vaidehi J. and Rajendiran A.: Monoculture of indigenous freshwater fish species *Puntius sophore* and its cost benefit analysis. Intern. J. Zool. Invest. 11(2): 1244-1248, 2025.

<https://doi.org/10.33745/ijzi.2025.v11i02.123>



This is an Open Access Article licensed under a Creative Commons License: Attribution 4.0 International (CC-BY). It allows unrestricted use of articles in any medium, reproduction and distribution by providing adequate credit to the author (s) and the source of publication.

## **Introduction**

Freshwater aquaculture is the oldest recorded aquatic resource production system, dating back more than 2,500 years (Anbalagan *et al.*, 2023). India is currently a major contributor to fish

production based on aquaculture (Goswami and Zade, 2015) and ranks 2<sup>nd</sup> in the world in inland fish production (Biswas *et al.*, 2018). Tamil Nadu possesses a very large inland water resource base

of about 3.83 lakh hectares comprising reservoirs, major and minor irrigation tanks, short seasonal tanks, ponds, rivers, backwaters, and water bodies (Vignesh *et al.*, 2017).

Since the world's population is estimated to be 9 billion by the mid-century, coupled with climate change and land degradation, aquaculture is likely to contribute towards making food globally secure and sustainable (FAO, 2016). Its variation in density and diversity are a key metric for evaluating the health of an aquatic ecosystem (Annamalai *et al.*, 2023). They can also be used to forecast the likely success or failure of an aquaculture production cycle (Morris and Mischke, 1999). With this in perspective, the current research was carried out in a permanent fresh water pond at Swamimalai, Thanjavur District, Tamil Nadu, India. *Puntius sophore*, also referred to as the pool barb, is a member of the Cyprinidae family within the order Cypriniformes. It has a broad range of distribution throughout India, Afghanistan, China, Bangladesh, Bhutan, Myanmar, Nepal, and Pakistan (Gupta *et al.*, 2015). It is of considerable market value as a food fish (Ahmed *et al.*, 2012) and is in great demand within the ornamental fish trade owing to its popularity among aquarium keepers (Gupta and Banerjee, 2014). Consequently, it is a valuable species for small-scale fisheries (Rahman *et al.*, 2020). Besides cultural fishes, wild fishes also provide a major bulk of fish protein. Hence, efforts are being made all over the world to exploit both the marine and freshwater bodies for fish production (Hawaibam *et al.*, 2016). However, the composition and flesh texture varies from fishes to fishes and are the main factors that determine consumer acceptance (Pal and Ghosh, 2013).

Fish is an important source of protein for mankind throughout the world. *Puntius sophore* has adapted to diverse freshwater environments (Gupta *et al.*, 2015) and occurs abundantly in Tamil Nadu, India. Due to its ecological resilience and economic value, the current research sought to determine its monoculture potential within two months.

## Materials and Methods

The aquatic system chosen for the present investigation is a freshwater pond situated in Swamimalai in Kumbakonam Taluk of Tanjore District, Tamil Nadu, India. The details of monoculture of this species is presented in Table 1 which gives the stocking details, time of culture, feed given along with harvest details and survival rate at the end of the culture period. The study was carried out during January to March 2025.

## Results and Discussion

The present study on *Puntius sophore* monoculture was carried out in the freshwater pond. The culture details are presented in the Table 1. The economics and cost benefit analysis of monoculture of *P.sophore* are expressed in Table 2 and 3. As evident from the table, a total of 159.755 kg of fish was harvested and sold under two categories. Big sized fishes weighing 122.15 kg were sold at Rs.200/kg which amounted to Rs.24,430 and the smaller sized fishes weighing 34.6 kg were sold at Rs.150/kg which generated Rs. 5,190. Thus, on the whole, the income generated was Rs.29,620. The expenditure incurred for the entire culture amounted to Rs. 13,100 (Table 3). Thus, on the whole, the profit worked out as Rs.16,520. Thus study again clearly disclose that both the system and the candidate species are suited to be cultured. More profits can be expected if the duration of culture is extended. The similar results were obtained in various freshwater fishes by various authors. (Sivakami, 1996; Sagunthala, 2020; Sivakami *et al.*, 2025; Thanga Kiruba, 2025). The results of the present study clearly suggests that with proper management, raising of healthy and economically viable fishes can be achieved by following proper stocking density and advices from aquaculture specialists. In addition to providing a cheap source of food rich in protein and other essential nutrients, aquaculture can also be used for economic development in urban areas where innumerable unutilized aquatic systems are available. The results of the present study clearly disclose that both the system and the candidate

Table 1: Details of the *Puntius sophore* in the Freshwater Pond at Swamimalai

| S. No. | Description                                     | Pond                                                                                                                                                                               |
|--------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.     | <b>Seed Collection</b>                          | Local breeding, Swamimalai                                                                                                                                                         |
| 2.     | <b>Stocking Details (Standard Growth Stock)</b> |                                                                                                                                                                                    |
|        | a) Weight range of fingerlings (g)              | 2.2 - 3.4 g                                                                                                                                                                        |
|        | b) Average weight of fingerlings (g)            | 2.8 g                                                                                                                                                                              |
|        | c) Fingerling length (cm)                       | 2.4 - 3.0 cm                                                                                                                                                                       |
|        | d) Average length (cm)                          | 2.7 cm                                                                                                                                                                             |
|        | e) Total weight of fingerlings (kg)             | 28.0 kg                                                                                                                                                                            |
|        | f) Total number stocked                         | 10000 No                                                                                                                                                                           |
| 3.     | <b>Type of Culture</b>                          | Monoculture 2 months                                                                                                                                                               |
| 4.     | <b>Starting Date and Harvest Date</b>           | 20.1.2025 – 26.3.2025                                                                                                                                                              |
| 5.     | a) Feed details                                 | <b>Natural Feed:</b> Chicken waste, Crustaceans waste from local market, <i>aquatic plants in addition</i><br><b>Artificial Feed:</b> Oil Cake + wheat Bran + Animal Based Protein |
|        | b) Amount of Feed given                         | 2% of the body weight both and Natural and Artificial Feed                                                                                                                         |
| 6.     | <b>Growth Measurement</b>                       | Every 15 days                                                                                                                                                                      |
| 7.     | <b>Harvest Details</b>                          |                                                                                                                                                                                    |
|        | a) No. of fishes harvested                      | 8900                                                                                                                                                                               |
|        | b) Weight range of fishes                       | 19.9 - 22.0 g                                                                                                                                                                      |
|        | c) Average weight                               | 17.95 g                                                                                                                                                                            |
|        | d) Length range of fishes                       | 7.4 - 8.9 cm                                                                                                                                                                       |
|        | e) Average fish length                          | 8.15 cm                                                                                                                                                                            |
|        | f) Total Weight of fishes harvested             | 159.755 kg                                                                                                                                                                         |
|        | g) Harvest mode:                                | Repeated netting                                                                                                                                                                   |
| 8.     | <b>Survival rate (%)</b>                        | 89.0 %                                                                                                                                                                             |

Table 2: Cost Benefit Analysis of the *Puntius sophore* Culture of the Freshwater Pond

| Details of Account                                          |                        |
|-------------------------------------------------------------|------------------------|
| <b>Total Weight of Fishes Harvested: 159.755 kg</b>         |                        |
| <b>Sale of Fishes:</b>                                      |                        |
| a) Big size (122.15Rs. 200)                                 | : Rs. 24430.00         |
| b) Small size (34.60 kg @ Rs. 150)                          | : Rs. 5190.00          |
| <b>Total Sales</b>                                          | <b>: Rs. 29620.00</b>  |
| <b>Net Profit / Loss = Total Income – Total Expenditure</b> |                        |
| <b>(Rs. 29,620 – Rs. 13,100)</b>                            |                        |
| <b>Net Profit</b>                                           | <b>: Rs. 16,520.00</b> |

Net Profit = Rs. 16,520.00/- for 2 months

Table 3: Economics of the *Puntius sophore* culture in the freshwater pond at Swamimalai

| S. No.                          | Details of Expenditure                                                    | Rs.               |
|---------------------------------|---------------------------------------------------------------------------|-------------------|
| 1.                              | Fresh Water Pond Rent for 2 months                                        | 3000.00           |
| 2.                              | Cost of Fish Seeds (10000 no)                                             | 2300.00           |
| 3.                              | Transportation Cost                                                       | 500.00            |
| 4.                              | Fertilizers and Lime                                                      | 300.00            |
| 5.                              | a) Natural Feed Cost for 2 months<br>b) Artificial Feed Cost for 2 months | 900.00<br>1900.00 |
| 6.                              | Labour Charges for 3 months (Rs.500 per month)                            | 1000.00           |
| 7.                              | Electricity and Fuel                                                      | 400.00            |
| 8.                              | Harvesting Charges                                                        | 700.00            |
| 9.                              | Miscellaneous                                                             | 300.00            |
| 10.                             | Fish Net Charges                                                          | 500.00            |
| 11.                             | Watch and Ward                                                            | 1000.00           |
| 12.                             | Transport and Marketing                                                   | 300.00            |
| <b>Total Amount Expenditure</b> |                                                                           | <b>13100.00</b>   |

species used for culture can be definitely utilized profitably. After assessing the water body, the next step is to choose the candidate species for aquaculture. India is known as a country of indigenous fish culture where most of the farmers culture carps. However, India is bestowed with a number of small indigenous fishes which are

present in almost all the aquatic systems which is very nutritive and cheap protein available in Tamil Nadu, we must use it locally.

### Ethical Statement

No animal or microbes have been used or sacrificed for this study, hence Ethical Approval

not required.

## Author Contributions

Each author has contributed equally to the study's planning, analysis, writing, and editing. All authors have read and agreed to the published version of the manuscript.

## Conflict of Interest

The authors declare no conflicts of interest.

## References

- Ahmed K, Halim S and Sultana S. (2012) Participation of women in aquaculture in three coastal districts of Bangladesh: approaches toward sustainable livelihood. *World J Agric Sci*. 8: 253-268.
- Anbalagan R, Nazar AR and Sivakami R. (2023) Culture of fresh water prawn *Macrobrachium rosenbergii* and its cost benefit analysis using low cost feed. *Uttar Pradesh J Zool*. 44(24): 192-196.
- Annamalai A, Radhakrishnan K, Gunasekaran C and Narasimman M. (2023) Temporal changes in plankton diversity in relation to hydrographical characteristics at Perumal lake, Cuddalore District, Tamil Nadu, India. *J Basic Appl Zool*. 84: 13.
- Biswas P, Bhattacharya T, Chanda A, Das S and Hazra S. (2018) Urban Wetlands – CO<sub>2</sub> sink or source? A case study on the aquaculture ponds of East Kolkata Wetlands. *Int J Rec Sci Res*. 9(2): 24158-24165.
- FAO. (2016) The State of food and agriculture climate change, agriculture and food security, Food and Agriculture Organization of the United Nations Rome, pp. 1-194.
- Goswami C and Zade VS. (2015) Analysis of international trade and economical and commercial scope of ornamental fishes. *Int J Engineer Appl Sci*. 2(5): 5-10.
- Gupta S and Banerjee S. (2014) Indigenous ornamental fish trade of west Bengal 1<sup>st</sup> edn., Narendra Publishing House, New Delhi, pp. 170.
- Gupta V, Gandotra R, Koul M, Gupta S and Parihar DS. (2015) Quality evaluation and shelf life assessment of raw and value added fish product (fish cutlet) of *Wallago attu* during frozen storage conditions (-12° C). *Int J Fish Aquat Stud*. 2(6): 243-247.
- Hawaibam R, Mayanglambam S and Chungkham S. (2016) Nutritional values of some fresh water fishes from two different districts of Manipur. *J Agricult Engineer Food Technol*. 3(3): 225-229.
- Morris JE and Mischke CC. (1999) Plankton management for fish culture ponds. *Environ Sci Technical Bulletin Series no.* 114. [https://www.ncrac.org/files/inline-files/TB114\\_0.pdf](https://www.ncrac.org/files/inline-files/TB114_0.pdf)
- Pal M and Ghosh M. (2013) Assay of biochemical compositions of two Indian freshwater Eel with special emphasis on accumulation of toxic heavy metals. *J Aquat Food Prod Technol*. 22: 27-35.
- Rahman M, Mondal G, Mithu M, Rabbane G and Mustafa G. (2020) Growth performances and proximate composition of *Mystus cavasius* (Hamilton, 1822) cultured in recirculating aquaculture system under different stocking densities. *Dhaka Univ J Biol Sci*. 29(2): 137-145.
- Sagunthala S. (2020) Liminological investigations of a renovated pond in Tamilnadu to assess its aquaculture potential. Ph. D. Thesis, Bharathidasan University, Tiruchirappalli, India.
- Sivakami R. (1996) Liminological profile of two contrasting lentic systems and their aquaculture Potential. Ph.D. Thesis, Bharathidasan University, Tiruchirappalli, India.
- Sivakami R, Babu V, Balasubramanian P and Rajendiran A. (2025) Study on fresh water fish monoculture of PACU (*Piaractus brachipomus*) at Kumbakonam, Tamil Nadu, India. *Uttar Pradesh J Zool*. 46(22): 68-75.
- Thanga Kiruba Y. (2025) Culture potential of a freshwater pond with fish nutritional status and its economic assessment. Ph.D. Thesis, Bharathidasan University, Thiruchirappalli, India
- Vignesh K, Kumar VS, Rajakumar M, Chidambaram P, Kanaga V, Pasupathi P and Rajarajan P. (2017) An analysis of socio-economic profile and constraints of the Indian major carps (IMC) seed rearing farmers in Thanjavur District, Tamil Nadu. *Int J Fish Aquat*. 5(4): 308-310.