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Dr. Patit Paban Halder
Senior Aquaculture Researcher, Department of Education, Seacom Skills University, West Bengal, India

Dr. Manjusha Tarafdar
Professor, Department of Education, Seacom Skills University, West Bengal, India

Dr. Sanjoy Mukharjee
Professor, Department of Music & Culture, Seramrpore College, West Bengal, India

Agnidyuti Halder
Student Researcher, Department of Botany, Scottish Church College, Kolkata, West Bengal, India

Kabita Halder
Practicing Fish Farmer & Trainer, Ornamental Fish Production Unit, Chandannagar, West Bengal, India

Corresponding Author:
Dr. Patit Paban Halder
Senior Aquaculture Researcher, Department of Education, Seacom Skills University, West Bengal, India

Integrating technology, tradition, and therapeutic sound in accelerated growth of ornamental fish

Patit Paban Halder, Manjusha Tarafdar, Sanjoy Mukharjee, Agnidyuti Halder and Kabita Halder

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Abstract
This study explores a cost-effective and innovative approach to enhancing the growth of ornamental fish by integrating traditional methods, modern technology, and therapeutic sound practices. Empirical observations over a 45-day period demonstrated that combining environmental control, scientific feeding, water quality maintenance, and music-based behavioral interactions can significantly increase fish weight. The aim is to empower small-scale entrepreneurs and unemployed youth through sustainable and humane aquaculture practices.

Keywords: Ornamental fish, music therapy, aquaculture, tank farming, socio-technical growth, bio-environmental control

1. Introduction
Ornamental fish farming has become a viable livelihood, especially in space-limited and low-investment conditions. However, consistent growth and marketability require refined methods. This paper presents a three-tiered methodology—from traditional to technologically enriched, culminating in therapeutic practices using sound and social bonding—to maximize growth.

Materials and Methods: Fish of the same genetic lineage, age (15 days), and weight (1g) were reared under controlled conditions. Three distinct groups were cultivated in uniform tanks:

- Group A: Traditional methods only
- Group B: Traditional + Technological methods
- Group C: All of the above + Music and Behavioral bonding

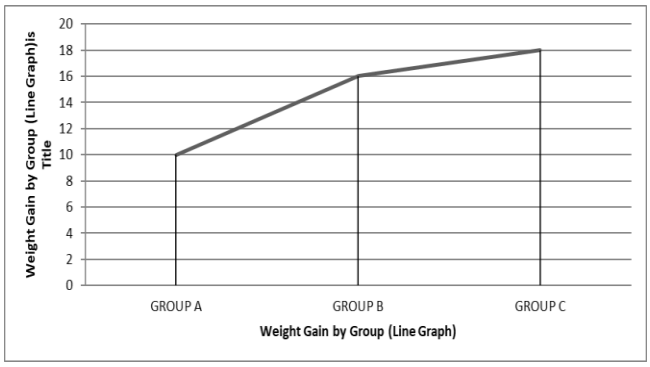
Results

Table 1: Comparative Growth Based on Treatment

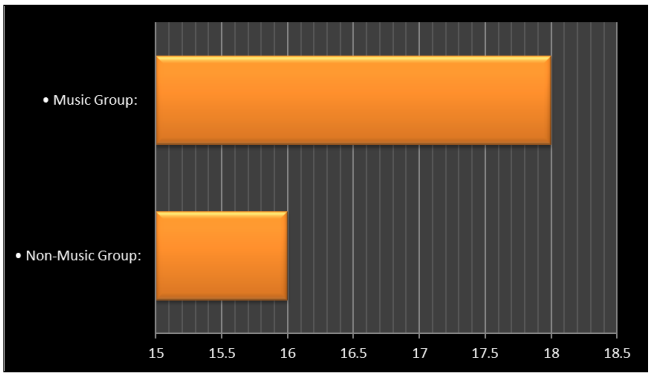
Group	Methods Applied	Weight After 45 Days	Total Gain	Value Addition
A	Traditional only	10g	+9g	-
B	Traditional + Tech	16g	+15g	+6g
C	A + B + Music + Social Bonding	18g	+17g	+8g

Graph 1: Weight Gain by Group (Line Graph)
- Group A: 10g
- Group B: 16g
- Group C: 18g

Graph 2: Impact of Music on Fish Growth (Bar Graph)
- Non-Music Group: 16g
- Music Group: 18g



Graph 1: Weight Gain by Group (Line Graph)



Graph 2: Impact of Music on Fish Growth (Bar Graph)

Technological and Nutritional Interventions

Table 2: Components and Functions

Component	Function
Circular tanks	Promotes even swimming and reduces stagnation
Aerator & Powerhead	Ensures oxygen flow and current creation
Multi-layered filtration	Maintains water clarity and hygiene
Protein-rich diet	Enhances growth rate
Vitamins & Minerals	Boosts immunity and metabolism
Trace Elements (Zn, Mn, K)	Maintains cellular health
Natural sunlight and airflow	Reduces gas build-up

Water Quality Standards

- pH: 6.5–7.8
- TDS: 150–300 ppm
- NO_2: ≤ 0.1 ppm
- Temperature: 26–28°C

Discussion

The combination of feeding, aeration, selective breeding, and sanitation provides a robust baseline for fish growth. However, the additional introduction of rhythmic sound and caretaker interaction positively affects behavioral stimulation, appetite, and stress reduction—thereby increasing growth.

This model can be easily adopted in low-income communities and training centers, offering not only income but also socio-psychological benefits. It demonstrates the value of emotion and environment in aquaculture.

Conclusion

A holistic approach to ornamental fish farming—integrating science, sensitivity, and sustainability—can significantly boost productivity. The success of Group C indicates that therapeutic techniques like music are not merely aesthetic but have practical impacts on fish biology. This opens new frontiers in ethical and innovative aquaculture.

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