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Murrel Culture: High-Value Fish for Higher Income

*Dr. M. Ponmani¹ and Dr. V. Sasikala²

¹Subject Matter Specialist-Fisheries, ICAR- Krishi Vigyan Kendra, TANUVAS, Namakkal-637002, India

²Associate Professor and Head, ICAR-Krishi Vigyan Kendra, TANUVAS, Namakkal-637002, India

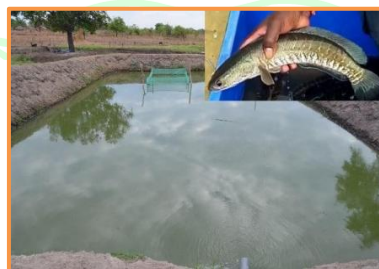
*Corresponding Author's email: ponmanimuthu21@gmail.com

Murrel (Snakehead fish, *Channa spp.*) is one of the most valuable indigenous freshwater fish species cultured in India. Due to its excellent taste, high nutritional quality, medicinal properties, and ability to survive under low dissolved oxygen conditions, murrel commands a premium market price in many parts of the country. Scientific murrel farming offers immense opportunities for enhancing farm income and strengthening rural livelihoods. The culture technology of striped murrel (*Channa striata*) has been standardized and includes broodstock management, induced breeding, fry and fingerling production, and grow-out culture. Under proper management practices, farmers can achieve production levels of 2.0–2.5 tonnes per hectare annually. With increasing consumer preference for live and fresh fish, murrel farming is emerging as a profitable and sustainable aquaculture enterprise for small-scale and commercial farmers alike.

Keywords: Murrel culture, Snakehead fish, Freshwater aquaculture, Fish breeding, Fry production, Fingerling rearing, Grow-out culture, High-value fish farming.

Introduction

Murrels belong to the family Channidae and are widely distributed across tropical Asia and Africa. Globally, 33 species have been identified, of which 30 belong to the genus *Channa* and three to *Parachanna*. India is home to 13 murrel species, among which striped murrel (*Channa striata*), great snakehead (*Channa marulius*), and spotted snakehead (*Channa punctata*) are commercially important.



Murrel is commonly known as snakehead fish because of its snake-like appearance. The species is highly valued in states such as Tamil Nadu, Andhra Pradesh, Karnataka, West Bengal, Assam, Uttar Pradesh, and Haryana due to its superior taste, nutritional quality, and medicinal significance. The presence of a specialized air-breathing organ enables murrels to survive in low dissolved oxygen conditions and even remain alive outside water for extended periods, making them highly marketable in live fish trade.

Broodstock Management

Pond Preparation

Healthy broodstock management is essential for successful murrel seed production. Brood fish are generally reared in earthen ponds ranging from 0.04 to 0.10 ha with a water depth of 1.0–1.5 m. Pond dykes should be strong and well-maintained to prevent fish escape during the monsoon season. To enhance natural productivity, farmyard manure is applied at a rate of 5,000 kg/ha/year and lime at 300 kg/ha/year.



Stocking and Feeding

Broodstock are stocked at a density of 2,000–2,500 kg/ha and are fed daily with a mixture of low-value fish and rice bran at 2–3% of their body weight. Generally, two-year-old brood fish are preferred for breeding because of their better reproductive performance and egg production.



Sex Identification

The sexes can be distinguished during the breeding season based on their external characteristics. Female murrels possess a soft, bulging abdomen due to the development of ovaries, and the genital opening becomes reddish and oval-shaped. In contrast, male murrels have a comparatively rounded head and a smaller genital papilla, making them easier to identify during broodstock selection.

Breeding Techniques

Natural Breeding

Murrels naturally breed during the rainy season when environmental conditions are favorable for spawning. In this method, brood fish weighing between 100 and 250 g are stocked in shallow ponds containing aquatic vegetation. The aquatic weeds provide suitable nesting sites and create a natural environment that stimulates breeding activity. After spawning, the eggs are collected from the ponds and transferred to hatchery facilities for incubation and hatching. Although natural breeding is simple and cost-effective, its success rate is relatively low, with breeding responses generally ranging between 20 and 30 percent.

Induced Breeding

Induced breeding is widely practiced to enhance seed production and ensure a reliable supply of murrel seed. The breeding tanks are maintained with a water depth of 40–80 cm and a temperature range of 25–28°C. Aquatic weeds covering approximately 20 percent of the breeding area are provided to stimulate spawning behavior. Hormonal induction is carried out using either Human Chorionic Gonadotropin (HCG) or Carp Pituitary Extract. HCG is administered at a dose of 2,000 IU/kg body weight for females and 1,500 IU/kg body weight for males. Alternatively, Carp Pituitary Extract is administered at 30–40 mg/kg body weight for females and 20–30 mg/kg body weight for males. Following hormone administration, spawning generally occurs within 16–18 hours.

Egg Characteristics and Hatching

Murrel eggs are spherical, free-floating, and non-adhesive in nature. Freshly fertilized eggs are bright yellow in color and have a diameter ranging from 1.2 to 1.5 mm. Under suitable incubation conditions, hatching takes place within 20–24 hours. Induced breeding generally results in high reproductive performance, with fertilization rates ranging from 80 to 98 percent and hatchability rates between 70 and 90 percent, making it an efficient method for large-scale seed production.

Fry production

After hatching, the yolk sac of murrel larvae is completely absorbed within 1–2 days, after which the fry begin active feeding. From the third day onwards, the fry primarily consume live feeds such as protozoans,



rotifers, and cladocerans, which provide essential nutrients for their early growth and development. During this stage, two major challenges commonly encountered are heterogeneity and cannibalism. Heterogeneity refers to uneven growth among fry caused by competition for food and space, while cannibalism occurs when larger fry prey upon smaller individuals, resulting in significant mortality. These problems can be minimized by maintaining optimum stocking density, ensuring adequate feed availability, conducting weekly grading and segregation of larger fry, and providing high-protein feed containing 40–50% protein. Under proper management practices, a survival rate of 50–60% can be achieved during the fry rearing stage.

Fingerlings production

As the fry develop into fingerlings, their diet expands to include zooplankton, aquatic insects, tubifex worms, and earthworms. During this stage, fish are commonly fed a mixture of low-value fish and rice bran in ratios ranging from 3:1 to 8:1, depending on feed availability and cost. Feeding is generally provided at 6–8% of body weight per day, while the dietary protein requirement ranges between 40 and 45%. Appropriate stocking density is critical for achieving optimum growth and survival, as overcrowding can lead to reduced growth rates and increased competition. Studies have shown that moderate stocking densities result in better growth performance compared to excessively high stocking densities. With proper feeding and management, fingerling survival rates of 30–40% can be achieved.

Grow-Out Culture

Grow-out culture of murrel is typically carried out in earthen ponds of 0.1–0.2 ha area with a water depth of 1–1.5 m. For better growth and survival, fingerlings weighing more than 10 g are recommended for stocking. Aquatic vegetation covering about 20% of the pond area is beneficial as it provides shade, shelter, and a natural habitat for aquatic organisms that serve as supplementary food. To prevent losses from bird predation, ponds should be covered with protective nets. Fish are fed daily at approximately 5% of their body weight using either formulated feed or a combination of low-value fish and agricultural by-products. The recommended stocking density is about 10,000 fish per hectare. Under good management practices, murrels attain a harvest weight of 600–800 g within 10–12 months and can produce yields of 2.0–2.5 tonnes per hectare per year, making murrel farming a highly profitable aquaculture enterprise.

Advantages of Murrel farming

- High market demand and premium price
- Excellent nutritional and medicinal value
- Tolerates low dissolved oxygen levels
- Suitable for live fish marketing
- High profitability compared to many freshwater fish species
- Ideal diversification option for small and marginal farmers

Conclusion

Murrel farming is emerging as a profitable and sustainable aquaculture enterprise in India. With proper broodstock management, scientific breeding techniques, quality seed production, and efficient feeding practices, farmers can achieve higher productivity and income. The increasing consumer demand for live and fresh murrel fish makes it an attractive option for aquaculture entrepreneurs seeking high-value fish farming opportunities.

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