

Overview of Murrel Culture and Management Practices

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Introduction:

Murrels, also known as snakeheads, are among India's most delicious freshwater fish. They are commercially cultured due to their texture, flavour, low-fat content, rapid growth, and tolerance to high stocking density, among other factors. Because they have fewer intramuscular bones, they can use atmospheric oxygen for breathing in oxygen-depleted water. Snakeheads are consumed as food fish and as a traditional medicine for wound healing and pain reduction in some areas. The presence of specific amino acids and fatty acids, such as thromboxane and prostaglandin, contributes to this contrasting character. Snakeheads have a high amino acid content, indicating that they are a good source of dietary protein for humans.

These fish belong to other order Perciformes and the family of Channidae. There are currently 51 scientifically described species that belong to snakeheads. The most important type of Snakehead fishes cultured in India are *Channa marulius*, *C. striatus*, *C. punctatus* etc. Snakeheads are native to Asia and Africa but are commercially cultured as food fish in Thailand, Philippines, Vietnam, Taiwan and Cambodia. Still, the culture of the Snakeheads in India is limited due to less understanding of its cultural techniques.

Table:-1 Local names of Murrel fish in India

S.no	Local name	Language
1	Murrai	Hindi
2	Korameenu, Koramatta	Telugu
3	Viral meen	Tamil
4	Korava, Vatton, Varal	Malayalam
5	Cheng, Shol	Bengali

6	Maral	Marathi
7	Hal	Assamese
8	Gadisha	Odiya

Production trends:

Murrels contribute around 5% of the total inland fish output from rivers and reservoirs; apart from these, 10% to 15% are from tanks, ponds, and other sources. Murrel production ranges from 50 to 250 kg/ha in 6–8 months using a conventional composite culture method. In a semi-intensive culture with carps, *C. marulius* is expected to achieve 400-600 g in 6-8 months, whereas *C. striatus* (300-400 g) and *C. punctatus* (150-200 g) produce 300-500 kg/ha.

Breeding:

All murrel species show parental care and spawn in nests made of chopped pieces of aquatic vegetation or similar material in shallow marginal areas. Spawning takes 15–45 minutes, and the male's sperms fertilize the eggs placed by the female in the nest. The fertilized eggs float in a thin layer in the center of the nest and are golden-yellow or amber in color. Depending on the species, the eggs hatch in 20–57 hours at temperatures ranging from 16 to 33°C. The hatchling's size will be around 3.5 mm and can swim freely after about four days, when they measure about 6.8 mm. Males and females both help to care for the freshly hatched young for about 15–20 days, or until the larvae are about 3.5 mm long. Larvae feed on protozoa and algae as they hatch. The larval development takes around nine weeks, after which they move to the bottom and exhibit adult behaviour. The fry consumes animal items such as crabs, insects, small fish, and tadpoles.

Induced breeding:

Hypophysation has been used to induce spawning in most *Channa* species. For this, the female with a soft and swollen belly is selected. And males are determined by external evaluation of genital papilla as they do not ooze milt by pressure. Before spawning, selected brood fish are kept in separate brood ponds and fed on live food such as small fish and tadpoles for two to three months. Hypophysation with carp and catfish pituitaries at doses ranging from 40–80 mg gland/kg female in two injections was shown to be adequate for induced breeding of *C. marulius*, *C. striatus*, and *C. punctatus* under experimental conditions

and in female *C. maculatus* spawners weighing about 1 kg are injected with one or more common carp pituitaries, as well as 20 rabbit units of Synahorin, in two equal dosages separated by 12 hours. Male fish usually reproduce and do not require injection. Before spawning, the spawners should be placed in 3–4 m³ cages made of nylon netting in regular fish ponds. There should be a male and female pair in each cage, and without utilizing cages, five or six couples should be released in the small shallow ponds (7–10 m³). Spawning typically takes around a day, and the hatchlings are produced 24 to 30 hours after fertilization.

Culture practices:**Nursery culture:**

Murrel spawns are transferred from the breeding tank to the nursery tank after one month. The stocking density in this tank is approximately 1000-1500no/m². In the nursery stage, the seed is acclimated to commercially produced pellet feeds for 25 to 65 days before being moved to grow-out ponds.

Grow out culture:

A pond of 0.1-0.2 Ha area with a water depth of 1 to 1.5m is ideal for the growth of striped murrels. Lining can be applied to the pond bottom and the dyke to prevent water seepage. Stocking sizes of 8-12cm weighing 12-20gm are recommended for grow-out culture, with a stocking density of 10000-15000/ha. Over an 8-10 month period, annual growth is predicted to be 600-700gm. Boiled and chaffed chicken waste/earthworms fed daily at 10% body weight is ideal for fingerlings. Arranging light traps over the pond at night to attract the insects is ideal for reducing the feed cost. Bird fencing is mandatory as the murrels are marginal feeders with a dwelling nature. Segregation according to the size is required in murrels because 2-3% of the fish turn into shooters and prey on the smaller ones.

Monoculture

Shallow ponds with a surface area of 800 m² to 0.5 hectares are used. The typical pond preparation, including draining, liming, and drying of the pond bottom, is required, with a stocking density of 75–460 no of *C. striatus* fry were stocked per square metre of the pond area. Trash fish, rice bran, and broken rice are fed thrice daily in an 8: 1: 1 ratio. The trash fish ratio may occasionally be increased to 13. In seven to eight months, the fish reach market size. This culture method is primarily followed in Thailand and Hong kong.

Polyculture

Murrels are cultured alongside Chinese carp, and Tilapia produces a high yield as compared to monoculture. In the Chinese carp cum murrel culture, murrel fingerlings of 10cm length are introduced at a rate of no more than 500 per hectare, and they graze on weed fish. Whereas in Tilapia cum murrel culture, the optimal stocking density is around 90,000/ha, and the murrels feed on the fry produced by wild spawning of Tilapia. To avoid cannibalism, the murrel stock is graded twice or three times during the culture phase, eventually reducing stock density to 15,000–24,000/ha.

Feed management:

Murrels are voracious predatory carnivorous fish that feed on living animals ranging from invertebrate larvae to the fry of other fish and even frogs. The best suitable diet for the brood fish is chicken intestine (70% protein), fish waste (56% protein) and beef liver (63% protein). The 4-day-old spawn is fed tubifex, moina, and artemia, whereas the 5- to 10-day-old spawn is given trash fish and moina. From the tenth day, a mixture of earthworms, trash fish, dry fish meal, and soya flour at 5-10% bodyweight is broadcasted over the pond twice every day. During the growth stage, the fish can be given a 3:1 mixture of boiled trash fish, chicken intestine, groundnut cake, and rice bran. Feed converted murrels can be fed pellet feed at a rate of 5 to 10%, depending on size.

Table:- 2 Nutritional Requirements in various stages of the culture period

S.no	Weight of the fish (gms)	Protein/fat	Pellet size(mm)
1	15-50	45/10	2
2	50-100	45/8	3
3	100-500	40/6	4
4	500-750	40/6	4-6
5	750-1000	40/6	4-6

Under food shortage conditions, snakeheads can also turn cannibalistic (Boonyaratpalin et al., 1985), posing a severe challenge in rearing snakehead fry. The availability of proper foods that encourage higher growth determines the success of larval rearing.

Table:- 3 Common Diseases in murels culture

S .no	Disease	Causing agent	Symptoms
1	Red disease	<i>Aeromonas sps.</i>	Red patches on the body and in mouth parts
2	Saddle back disease	<i>Flexibacter columnaris</i>	Gray to brown patches on the body, hemorrhagic spots on the body
3	Dropsy	<i>Aeromonas hydrophyla</i>	Swollen abdomen, foul smell
4	Gill fluke	<i>Dactylogyrus</i>	Gills are clubbed with excess mucous and pale white in colour
5	skin fluke	<i>Gyrodactylous</i>	Skin and fins are affected, mucous secretion is more
6	Epizootic ulcerative syndrome	<i>Aphanomyxis invadens</i>	Red spots on the skin; form <u>ulcers</u> and extensive <u>erosions</u> filled with a <u>necrotic tissue</u> and <u>mycelium</u>

Conclusion:

Most people prefer murels because of their low-bone content and greater taste. In tropical countries like India, where water is scarce, there may be abandoned bodies of water with low levels of dissolved oxygen. Murels and other air breathing fish may have a big advantage in aquaculture because they can thrive in this type of environment. India needs to learn more about murel breeding, disease and nutrition management. It also has a significant potential of supplying employment to young people in rural regions by providing on-farm training and financial support.

References

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