

Culture of Climbing Perch and Pond Management

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SUMMARY

Climbing perch, *Anabas testudineus*, locally called 'Thai Koi', is a small-sized food fish which inhabits both freshwater and brackish waters of the Indian subcontinent and Southeast Asia. It can withstand harsh environmental conditions such as low oxygen, a wide range of temperatures and other poor water conditions. Over their native range, climbing perch occurs mainly in low-lying swamps, marshy lands, lakes, canals, pools, small pits and puddles. The fish contains a high amount of nutritionally available iron and copper, essential for haemoglobin synthesis. In addition, the fish also has a high amount of protein, easily digestible fat, and many essential amino acids. Due to its positive aspects, *Anabas koi* is considered one of the potential candidate species for aquaculture, and it could be achieved by captive breeding and water quality management.

INTRODUCTION

Anabas Koi (Anabas testudineus) is one of the most important food fish in North India. It is popular among a wide range of people due to its unique taste, freshness, and ability to strengthen the immune system of individuals. These fishes are rich in iron, copper, essential amino acids, and haemoglobin compounds that synthesize red blood cells, thus increasing the immunity of consumers. The climbing perch is one of the air-breathing fish species. Due to its dynamic physiological adaptations and high salinity tolerance, it can be cultured in waters where carp cannot be cultivated. Climbing perches help control aquatic pests and weeds in large tanks and ponds. There are two types of climbing perch fish varieties such as local and Thai. The local variety does not have body spots, whereas the Thai variety has body spots on its body's surface.



Fig 1. Anabas Koi (*Anabas testudineus*)

Salient features:

- These are the fast-growing fish species, reaching the marketable size of 40 – 60g within 3-4 months. Hence, 3 to 4 harvests in a year can be possible
- Culture technology and pond management are effortless
- Low capital investment and high stocking density are possible
- Can be grown in deep or shallow water
- Survives and grows well even in low dissolved oxygen water
- High disease resistant
- Can be sold in live condition

Sexual maturity and sexual dimorphism:

The climbing perch reaches sexual maturity when it reaches a weight of about 5-20 gm and a length of 8.0-10 cm. The breeding season peaks during monsoon in East India, and its fish seeds are available from April to August and peak availability during May-June. The difference between male and female fish can be detected only during the breeding season. Female fish are usually larger during the breeding season. Also, mature females have a soft and swollen abdomen, genital papillae are pink, and female fish have soft pectoral fins during the breeding season. Even gentle pressure on the abdomen will release the eggs. Whereas during the breeding season, the appearance of mature males differs from that of other fishes, with a denser and darker body colour with elongated pelvic fins. Also, during the breeding season, the pectoral fins of male fish are slightly more rigid, and the anal fins are sharper to the touch.

Breeding and maintenance:

Before breeding, male and female fish weighing 40-100 gm should be taken from the brooder pond and kept separately in cement tanks at a rate of 15/m², allowing them to get acclimatized to that environment. Generally, the recommended sex ratio for breeding climbing perch is 2:1 (male: female). As a supplemental feed for the brooder with the inclusion of fish meal, peanut meal, soya meal, and rice bran should be added along with vitamin and mineral pre-mixture formulated with a protein content of 30-35% should be fed at a rate of 3-4% to the body weight of the fish.

Water quality should be monitored regularly, and water exchange is necessary to maintain optimal water quality parameters. The genital papilla present in the anal fin of the fish should be checked frequently to monitor its maturity and development. Only fully mature fish should be selected for the breeding process.

1) Hormonal Induced breeding

Induced breeding hormones such as (OVAPRIM/ OVATIDE/ WOVA-FH/ GONOPRO FH) should be injected intramuscularly into the dorsal region of the fish at the rate of 0.5-1.0 ml/kg depending on the body weight of the female and male fish respectively. Injected fish are released into a breeding pond. Anabandid fishes typically build foam nests to protect their eggs. But climbing perch do not build any nests to protect their eggs. Thus the fishes can be removed from the breeding pond after spawning to prevent stress and cannibalism of female fishes due to exhaustion from breeding. It usually takes about 7-8 hours for the fish to spawn after the hormone injection.

A female fish can release a minimum of 4000 eggs to a maximum of 68000 eggs. A fertile female fish can release an average of 300-400 eggs/g body weight. The eggs are externally fertilized, small with a diameter of about 70-85 micrometres, and float on the water surface. They are non-sticky and look like tiny crystalline beads. Fertilized eggs are translucent like glass, but unfertilized eggs are opaque and appear milky in colour. Fertilized eggs are kept in plastic tanks / FRP tanks in stagnant water for hatching for about 12-15 hours at a water temperature of 26-28°C is optimal for hatching fish eggs.

2) Larval rearing

Usually, newly hatched fish fry (larvae) are 1.6-1.8 mm long and rest upside down. These are recommended to be grown in indoor culture tanks (FRP/concrete) of 500-1000-liter capacity with a minimum water depth of 15-20 inches. As young as three days old, they are fed primarily with egg yolk emulsion and zooplankton at a rate of 10²-10³ cells/ml, which continues for two weeks. Maintaining good water quality and environment is essential for optimal growth and survival of fish fry (larvae). Screening and using filtered water in the tanks can prevent the entry of large zooplankton, as these are detrimental to fry survival and development.

The fry can reach 12-16 mm in size in about 15 days. At this stage, they should be fed with plankton mixture, powdered oil cake, and rice bran (1:1). A stocking density of 1000-1500/m² of larvae is recommended for optimal survival and continued for three weeks. After three weeks, the stocking density of the fry should be reduced to 100-200 fish/m² and fed with floating feed containing 30-35% protein.

The irregularity in the growth rate in this fish is often observed. The main reason for the varied growth rate is the difference in feed intake of young larvae leading to cannibalism. Cannibalism can be avoided by sorting, wherein larger fry is collected and reared separately. For the first two months, the fish seed will grow to 35 to 40 mm and be ready for stocking.

Grow out culture:**1) Fish Feed**

Although climbing perch will accept all types of feed, better growth can be obtained using high-quality feed. For these, supplementary feeds are formulated as 30% crude protein with ingredients such as fish meal, peanut meal, soya meal, and rice bran should be supplemented with vitamin and mineral pre-mixture and as a diet. Usually fed twice a day and at a rate of 5% of their body weight. Climbing perch are insectivorous, so placing a hanging lamp just above the tank/pond/cage is an excellent way to attract insects. When the insects fall to the water's surface, it can engulf them, providing an additional food source for these fishes.

2) Stocking

The recommended stocking density for climbing perch culture is 5 to 6 fish/m².

3) Pond culture and management

Small-scale farms of about 0.05-0.2 ha are sufficient for this culture, for pond management, one should follow the procedures for carp farming. Cow dung can be used as a fertilizer to make natural fish food organisms for fish. Also, stocking the surface of the water with 40% floating aquatic plants such as Pistia and Eicchornia can easily remove toxic wastes that accumulate at the bottom of the pond. When the water level is high during the rainy season, climbing perch may escape from one pond to another. The fish escape can be prevented with the pond bank inclined at an angle of more than 75°. Stone-lined ponds are also can be used. The pond should be enclosed with net fencing or bird-scaring devices to prevent predators. Also, it is recommended to reduce the pond's water level to half during the rainy season. At the end of the culture period, these fish reach marketable size (50 - 60 g) in 4 - 6 months. In a one-hectare pond, (14.17 g/ 9.31 cm) size fingerlings stocked low at a rate of 3/m², resulting in an average production of 1,279 kg/ha per culture cycle.

Optimum parameters for culture management

Water Quality Parameter	Desirable Level
Dissolved oxygen (mg/l)	2 - 7.4
Transparency (cm)	28 – 30
Temperature °C	23 – 29
CO ₂ (mg/L)	2.30 - 3.23
pH	6.8 – 7.2
Total Alkalinity (mg/L)	48 – 50



Fig 2. Harvested catch of climbing perch

Cage rearing:

As an alternative method, climbing perch can also be cultured in cages by stocking 550 fish/cage in a cage of size (3m x 2m x 1.5m). A study has shown that feeding these animals with natural feed and a supplementary diet can improve growth performance in climbing perch with a crude protein level of 30%. Fishes-grown cages reach an average weight of 62 grams in 4 months, with a survival rate of 67 percent.

Harvesting and growth rate:

Water in the pond is drained for harvesting the fish, and the fish are easily harvested by hand picking. The demand for Panayerikendai (*Anabas*) fish is year-round, and these fish have good market value. The market price of this fish is around (Rs. 200-300/kg). Average gross yield is generally higher in fish farming when stocking is reduced. But a study concluded that the average total yield of 4,037 kg acre⁻¹ could be observed at a high stocking density of 14 fish/sq.m when rearing these climbing perch. In addition, when these fish are reared in ponds and cages, the average production is 0.3 to 1.0 kg/m² and reaches 40 - 60 g in four months. Through this, freshwater fish farmers can get benefit by earning profit.

CONCLUSION

Among air-breathing fishes, *A. testudineus* is considered a delicacy in India's eastern, northeastern and southern states. Demand for this fish is very high for its delicate flavour, prolonged freshness out of the water and valuable diet for sick and convalescent. The present market value ranged from INR 150 to 250 per kg. Aquaculture of this species with protein-enriched supplementary feed might increase production, and regular water supply in the ponds might lead to increased fish production.

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