

# Breeding of Tinfoil Barb [*Barbonymus schwanenfeldii*] Fish in Controlled Environment

Sheeza khanam<sup>1</sup>, Dr. T. Jagadeeshwara chari<sup>2</sup>, Dharavath Ram Kumar<sup>3</sup>

MSc.Fisheires Government degree & Pg college siddipet, Affiliated to Osmania University, India

## Abstract

This paper discussed Breeding of Tinfoil barb from the freshwater aquaculture development. Collection and maintenance of freshwater adult fish was the first step followed by characterization of fish, broodstocks selection and maturation, control of fish reproduction, and larval rearing. Aquaculture development of tinfoil barb farming is needed to increase production. This study aimed to evaluate the reproductive performance, growth and outbreeding Spawning carried in the aquarium with 1 x 0.5 m length and 50 cm height of fresh water as full sub ratio 1:1 (one female: one male). The tinfoil barb is an active, peaceful species that spends most of its time in the mid-level and bottom of the water. A greedy eater, it will attempt to fill its mouth with as much food as possible during feedings. In captivity, it will eat almost anything provided to it. They are generally not a significant catch. The Tinfoil Barb is a vibrant and energetic freshwater fish native to Southeast Asia, highly valued in the aquarium trade for its striking appearance and social behavior. However, the increasing popularity of this species has led to significant pressures on wild populations, primarily due to overfishing and habitat loss. As a result, the sustainability of Tinfoil Barbs in the wild is at risk, and the need for responsible aquaculture practices. This breeding project aims to develop breeding of Tinfoil Barbs in a controlled environment, thus reducing reliance on wild-caught specimens. By optimizing breeding conditions and enhancing fry survival rates, the project is to create a sustainable source for the aquarium.

**Keywords:** Selection of brooders, Breeding conditions, Spawning, Growth stages

## 1. INTRODUCTION:

### TINFOIL BARB (*Barbonymus schwanenfeldii*)

A popular freshwater fish known for its striking appearance and active behaviour originating from Southeast Asia, these fish is recognised for their metallic sheen and peaceful nature. These fish are popular in aquariums due to their appealing appearance and active behaviour Breeding tinfoil Barb in captivity presents challenges due to their size, specific environment needs and natural behaviours, but with careful attention to their habitat and conditions successful breeding is possible Tinfoil barb are a species belongs to the family Cyprinidae. They have elongated, torpedo-shaped bodies with large, reflective scales that give them their characteristic shiny appearance. It is distinguishable from other species of the genus in having a red dorsal fin with a black blotch at the tip, red pectoral, pelvic and anal fins, red caudal fin with white margin and a black submarginal stripe along each lobe, and 8 scale rows between dorsal-fin origin and lateral line. Large individuals are silvery or golden yellow while alive with its dorsal fin red and caudal fin orange or blood-red. It grows up to 14 inches (35 cm) in length. Tinfoil barbs have a lifespan of 10 to 15 years. The barbs are native to Europe, Africa, and Asia. The members of this genus typically have one or more pairs of barbels (slender, fleshy protuberances) near the mouth and often have large, shining scales. Large individuals are silvery or golden yellow while alive with its dorsal fin red and caudal fin orange or blood-red Tinfoil Barb is an excellent active and peaceful community fish that can be kept with other large fish, including cichlids. Tinfoil Barbs are not aggressive and mix well with other medium-large sized fish of similar temperament. However, due to their adult size, tankmates should be chosen with care as large Tinfoil Barbs are more than capable of taking small fish. Tin Foil barbs are friendly and non-aggressive fish. They should be kept in groups of 4 or more. They will swim in middle or lower part of aquarium. You can have goldfish, angels, cichlids, Oscars with them. Tinfoil Barbs prefer a slightly acidic to neutral pH range of 6.5 to 7.5 and a temperature between 72 to 79°F (22 to 26°C). It's essential to maintain good water quality, as they are sensitive to fluctuations in water parameters. Tinfoil barbs grow to a large size in a short

amount of time. Even though most are sold when they're around 2 inches long, they don't stay small for long and can reach 14 to 16 inches. Tinfoil barbs will eat certain types of algae and can often pick at aquarium plants. As they grow, frozen shrimp and bloodworm to supplement. Some species will require slightly cooler temperatures and can be kept in an unheated aquarium. These are bright yellow coloured fish that are very well behaved, medium-sized and easy to keep. They suit community aquariums of 90cm and 180 litres or more which are just as happy in unheated aquariums and are suitable for beginners too. lifespan of Tinfoil Barb in the wild can vary depending on several factors, including their habitat, food availability, predation pressures, and environmental conditions. In their natural habitat, they typically have a lifespan that ranges from 5 to 10 years on average. In captivity, where they are protected from many natural threats and provided with optimal conditions, Tinfoil Barb can often live longer than their wild counterparts. With proper care, they can live for 10 to 15 years or even longer in an aquarium setting. In their natural habitat, the size of Tinfoil Barb can vary depending on their age, growth rate, and environmental conditions. In the wild, adults can reach lengths of up to 14-16 inches (35-40 cm) or even larger in some cases. However, the average size of adults in their natural habitat may be somewhat smaller, depending on factors like available food resources and environmental conditions. It's important to remember that these are general guidelines, and individual fish may exhibit variations in size based on their unique circumstances. In captivity, where they are provided with consistent feeding

#### Tinfoil Barb Breeding Timeline:

Tinfoil Barb breeding behavior is influenced by seasonal changes in their natural habitat, particularly when water levels rise, and conditions become favorable for spawning. The rainy season typically leads to an increase in water levels, Known to engage in group spawning, which means that multiple individuals of both sexes participate in the breeding process. During this time, males and females gather in suitable spawning areas. These cleaned areas serve as suitable locations for egg deposition ideal conditions.

#### Tinfoil Barb fishing method:

This fish species is not typically targeted for sport or commercial fishing, and they are primarily known as aquarium fish rather than as a target species for fishing. In their native range in Southeast Asia, they may be encountered by local fishermen using various traditional fishing methods, but they are generally not significant to catch.

#### In the aquarium:

The tinfoil barb is a schooling species that prefers to be placed with a number of its own species. It prefers living in water with strong currents similar to those found in their native streams. It is also recommended that they be kept with fish of similar size or larger. Many unwary aquarists buy young specimens and find out too late how large the tinfoil barb can grow. The tinfoil barb is often seen in large aquaria as companions to large cichlids e.g. the oscar cichlid, *Astronotus ocellatus*. The presence of groups of active fish like the tinfoil barb, sometimes known as dither fish, helps mitigate aggression in more intolerant companions. The tinfoil barb is an active, peaceful species that spends most of its time in the mid-level and bottom of the water. A greedy eater, it will attempt to fill its mouth with as much food as possible during feedings. In captivity, it will eat almost anything provided to it. they are generally not a significant catch

## 2. METHODOLOGY:

### 2.1. Materials:

- Selective Aquarium tank
- Aerator
- Feed
- Decorators
- fish brooders

## 2.2. Breeding of tinfoil barb involves several steps;

Setup:

Provide a large tank With plenty of swimming space as tinfoil barb can grow quite large the tank should be well filtered and have stable water conditions

- Minimum Tank Size: 75 G (285L)
- pH Range: 6.0 – 7.5
- Water Hardness: 5 – 15 dH
- Temperature: 75°F – 80°F (24°C – 27°C)
- Lighting: Low to Moderate.
- Substrate: Any
- Water Flow: Moderate to high
- Tank Region: Will occupy all areas of your tank
- Tinfoil Barb Feeding Guide
- Diet: Herbivore
- Frequency: 2 – 3 times daily
- Pellet Foods: Yes
- Flake Foods: Yes
- Live Foods: They will occasionally eat small insects and crustaceans

## 2.3. Selection of Brooders

- Select healthy mature tin foil barbok for signs such as clear eyes active swimming and good coloration
- Tin foil barbs are more likely to breed If kept in groups rather than a pairs A ratio of one male to multiple females ( e.g., 1 male to 3-4 females) Is often effective
- Ensure that the brooders are of appropriate size and age
- Before introducing them to the breeding tank condition the brooders with a high quality diet to boost their health and reproductive readiness
- Male tin foil barbs are generally more colorful and have more extended fins compared to females observing their behaviour and body size can also help in identifying males from females

## 2.4. Gender

- Gender determination of Tinfoil Barb can be challenging, especially when they are young, as there are no prominent external sexual dimorphism characteristics (physical differences between males and females). However, as they mature and approach breeding age, subtle differences may become noticeable. In some cases, females may be slightly larger and have a fuller body shape compared to males. Males may appear slimmer, especially when they are not actively in breeding condition.
- During the breeding season, males may exhibit slightly longer, and more pointed dorsal and anal fins compared to females. These elongated fins can be more noticeable when the males are actively courting females. When females are ready to spawn, they may have a slightly rounder belly, which could be more pronounced when they are carrying eggs. There can be slight differences in coloration, especially when Tinfoil Barb are in breeding condition. Males may exhibit more intense colors and brighter hues, particularly on the fins, to attract females.
- Observing their behavior can provide clues about their sex. Males may become more territorial and engage in courting behavior, such as chasing females or displaying their fins more prominently. In some cases, you may be able to sex Tinfoil Barbs by examining the genital papilla, a small protrusion located just in front of the anal fin. In females, it may appear rounder and more pronounced, while in males, it may be slightly narrower and more pointed. However, this method may require experience and careful observation.

- Additionally, individual variations can occur, and not all Tin foil Barb will exhibit the same characteristics. The best way to accurately sex them is through observation of their behavior during the breeding season, especially if they are in an environment where they exhibit breeding behavior

- Breeding Behavior: Male tin foil barbs often display more intense coloration and may develop small tubercles (small, hard, raised areas) on their heads and pectoral fins. Males will chase and court females, displaying more active and aggressive behavior during the breeding period.

- Egg-Laying Behavior:

- Female tin foil barbs are responsible for laying eggs. When a female is ready to lay eggs, her belly might appear slightly swollen. During the breeding process, females will release eggs, and males will fertilize

## 2.5. Introducing Fish Brooders in the Aquarium:



Float the bag into the tank to match temperatures and slowly mix tank water in to the bag

- Gentle transfer the fish from the bag to the tank to reduce stress

## 2.6. Balanced diet

Provide a nutritional diet which have high quality pellets or flakes for barbs . This ensure they recieve essential nutrients for health and breeding

Tin foil Barbs will accept most fish food, including flakes, pellets, frozen and freeze-dried foods. They will also go after your live plants and any smaller fish if given the opportunity. Most barbs are omnivorous and will thrive on Aqueon Tropical Flakes, Color Flakes, Tropical Granules and Shrimp Pellets. Frozen and live foods can also be fed as treats or to help induce spawning. For best results, rotate their diet daily and feed only what they can consume in under 2 minutes, once or twice a day.

## 2.7. Feeding frequency

Feed them 2-3 times a day but avoid overfeeding Uneaten food can pollute the water so feed them in portions based on their consumption



Avoiding over-feeding is crucial, since obesity is unhealthy for all fish. Make sure to keep your Tinfoil barbs on a diverse diet that consists of a herbivore base, supplemented with the odd treat in the form of crustaceans and worm

#### **Protein:**

In addition to plant matter, tinfoil barbs also need a source of protein to meet their dietary needs. Offer them:

- High-quality pellets or flakes designed for omnivorous fish
- Frozen or live foods like brine shrimp, bloodworms, daphnia, and mosquito larvae
- Occasionally, you can provide them with small amounts of high-quality fish or shrimp as a treat

#### **Variety:**

Providing a varied diet is essential to ensure your tinfoil barbs receive all the necessary nutrients. Rotate between different types of foods to mimic their natural feeding habits and to prevent nutritional deficiencies.

#### **Observation:**

Pay attention to their behavior and appetite. If they are not consuming food as usual, it could be a sign of health issues or water quality problems.

#### **Feed management:**

Regularly clean the tank to remove any uneaten food and waste Monitor water parameters closely, as excess food can lead to poor water quality , which can negatively impact fish health

#### **Amount of feed:**

Offer an amount that they consume within a few minutes to avoid over feeding and water quality issues. Observe their feeding behavior to adjust portions as needed.

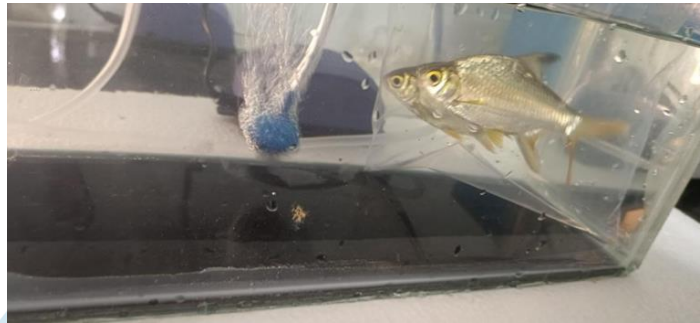
**Type of feed:** with live frozen foods like bloodworms, brine shrimp, and daphnia will provide additional nutrients

### **2.8. Aeration**

Tinfoil barbs are active swimmers and need a sufficient supply of oxygen. Therefore, the tank water should be well-oxygenated. getting an air stone or bubbler to help increase the surface area of water and provide more oxygen to the tank.

Though canister filters also provide aeration while agitating the water surface. It's still advisable to get air stones for adequate aeration.

A balanced diet is essential you can feed them high quality pellets or flakes supplementing their diet with live frozen foods like bloodworms, brine shrimp, and daphnia will provide additional nutrients



## 2.9. Aquarium Care

Tinfoil barbs are moderately easy to care for, especially when you keep their water clean. I recommend doing 25% to 50% water changes weekly or biweekly. Also, algae magnets should be placed to keep your tank free of algae. Overall, if you have a community tank with tank decorations and live plants, perform water changes weekly. Otherwise, monthly water changes are essential to keep the water clean.

## 2.10. Substrate

Though the tinfoil barb will do pretty much great in an empty tank, a sandy substrate with scattered rocks or pebbles is an ideal option for their tank.



## 3. BREEDING CONDITIONS

The female tinfoil barb lays around thousand eggs. However, they pose a serious threat to their eggs and might end up eating some. Therefore, it's advisable to separate the breeding pair once the eggs are laid and fertilized.

Though, there are no known cases of breeding tinfoil barbs in captivity. However, it would be a rewarding experience for aquarium

start with a separate breeding tank with a bare-bottom tank with spawning mops or live plants, so you can easily find their eggs. After you've set up the tank with the required water conditions, it's time to put the breeding pair in it. It's advisable to put one male for every 2-3 females.

Tinfoil barb breed during the rainy season, so you can stimulate their breeding behavior by increasing the water flow in the breeding tank and lowering the water level. Also, low water temperatures are recommended.

## Water parameters

Optimal tank water parameters are the following:

### Temperature:

Tinfoil barbs prefer a tropical environment with a water temperature between 72°F to 82°F (22°C to 28°C). Keeping the temperature within this range will ensure their metabolic processes function optimally.

### pH Level:

Tinfoil Barbs can tolerate a pH range of 6.5 to 7.5, but they generally thrive in slightly acidic to neutral conditions. Aim for a pH around 7.0 for optimal health.

### Water Hardness:

These fish are adaptable to a range of water hardness levels, but a general guideline is to keep the water moderately hard, around 5 to 12 dGH.

### Ammonia and Nitrite:

Both ammonia and nitrite should be maintained at zero. These compounds are toxic to fish and can lead to stress and health issues if present in the water.

**Nitrate Levels:** Nitrate is a less toxic byproduct of the nitrogen cycle, but elevated levels can still be harmful. Aim to keep nitrate levels below 20-40 ppm through regular water changes.

### Water Quality:

However, the tinfoil barb has far more strict requirements to tank water quality. Since tinfoil barb habitat is in clean oxygen-rich lotic waters, it can't stand any organic waste accumulation in water. Water in a tank has to be crystal clean. Tank maintenance is limited to weekly water renew (15–20% from the total tank volume). The fresh water has to have the same pH, dGH and temperature as well as regular bottom substrate cleaning and removing organic waste should be performed.

**Filtration and Aeration:** Tank water filtration system is of crucial significance in this case. It should consist at least of two filters that work in tandem or, if the capacity allows, duplicate each other in case if one turns off or breaks down. Providing efficient filtration and aeration helps maintain oxygen levels and keeps the water clean. Tinfoil barbs are active swimmers and produce waste, so proper filtration is important

## 3.1. Maintenance:

Breeding of tinfoil barbs require long term care and maintenance as they have relatively long lifespans and grow to large size. Regular water quality management and tank conditions is important for successful breeding

Maintaining good water quality is the single most important thing that an aquarium owner can do to ensure the health of their fish. Poor water quality is responsible for more aquarium fish deaths than any other factor

Ornamental fish culturists in cities often have water quality problem as the tap water used by them contains chlorine beyond permissible level. The growth and survival of any sensitive fish are affected by chlorinated tap waters. If the water quality is maintained with utmost care, the also be occurrence of many fish diseases can prevented. Temperature influence all metabolic and physiological activities and life processes such as feeding, reproduction, movement and distribution of aquatic organisms.

Water changes restore and maintain a balanced aquarium by physically removing and diluting harmful chemicals as well as replenishing vital elements.

As a defence against the effect of a low or high water pH, fish can produce an increased amount of mucus on the skin and on the inner side of the gill covers. Extremely high or low pH values cause damage to fish tissues, especially the gills, and haemorrhages may occur in the gills and on the lower part of the body.

### 3.2. Spawning

When the conditions meet their breeding requirements, the male tinfoil barb will follow the female and nudge their bellies to release the eggs. The eggs will later be fertilized by the male tinfoil barb. Since tinfoil barbs are known to eat their eggs, it's better to separate them after fertilization and spawning.

The eggs hatch in around 48 hours. And once they are hatched, the fry will feed on their egg sacs for 1 to 2 days. After a few days, you can feed them commercially available fry food or infusoria. Baby brine shrimp and mosquito larvae can also be given after a week.

It's important to maintain water quality to avoid diseases and other problems in the tank.

- Post spawning care
- After spawning,remove the adults to prevent them from eating the eggs
- The eggs hatch within 24-48 hours they are very small and require careful monitoring

### 3.3. Growth Stages:



- Early growth (0-1inch):
- provide gentle filtration to avoid strong currents that can stress the tiny fish
- Gradually increase the size of food as they grow offer small live foods like daphnia
- Adult stage (1-3 inches)
- As they grow transfer them to a larger tank with more swimming space
- Feed multiple times a day to promote growth

### 4. RESULTS:





- **Successful Spawning:** If the conditions are right, you'll observe spawning behavior and the presence of eggs or fry.
- **Egg Hatching :** With proper care, the eggs will hatch into fry within a few days.
- **Population Growth:** Successful projects can lead to a growing population of tinfoil barbs, depending on the tank size and management.
- **Survival Rates:** High survival rates of fry to adulthood, influenced by effective care and management practices.
- **Genetic Diversity:** Captive breeding programs can help maintain or even increase genetic diversity within the aquarium trade, leading to healthier fish.
- **Achieving successful breeding can provide a sense of accomplishment and satisfaction, enhancing your overall experience as an aquarium hobby**
- **Breeding in captivity can reduce the demand for wild-caught fish, contributing to conservation efforts and helping to preserve natural populations.**
- **Successfully breeding tinfoil barbs improves your understanding of their behavior, genetics, and care requirements, which can be rewarding and educational.**
- **Growing a breeding population of tinfoil barbs can enhance the visual appeal of aquarium with active and vibrant.**

## 5. CONCLUSION:

- **Effective breeding requires a well planned set-up including well maintained tank and optimal water conditions**
- **Conditioning fish with a high quality varied diet is important for successful spawning**
- **Creating a suitable breeding environment and understanding the conditions that stimulate spawning can encourage successful reproduction**
- **Providing proper care for both eggs and fry including water quality and feed for healthy development of the offspring**
- **As fry grow, adjusting their environment and diet is necessary for their progression from fry to fingerlings and adult**

The breeding project of Tinfoil Barbs has been a experience, allowing for an in-depth understanding of this vibrant species. Throughout the project by providing optimal conditions for breeding, including appropriate tank setup, water parameters, and nutritional needs. Tinfoil Barbs thrive in spacious tanks with swimming space, highlighting the importance of creating a suitable habitat for spawning. Observing their courtship r provided reproductive habits. Successfully raising the fry required attention to water quality and specialized feeding practices. In conclusion, the tinfoil barb breeding this species in captivity is successful While initial results were challenges such as disease management and fry survival. The project achieved initial breeding success, further studies are essential to improve fry care and increase overall yield.

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