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## To Study The Breeding Behaviour Of Guppy Fish:

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### Abstract:

Guppies exhibit breeding behaviour throughout the entire year, with the exception of the winter months, specifically December and January, while demonstrating a peak breeding period in July. The duration of the gestation period varied between 25 and 35 days, It was observed that the caudal region emerges first during the process of parturition. The quantity of fry produced per brood varied between 12 and 60. Newly hatched fries were documented as exhibiting either a transparent or dark pigmentation, characterized by an elongated morphology with developed jaws at the oral region, and demonstrated full capabilities for locomotion, ingestion, and evasion of threats. The guppy exhibited rapid growth, achieving sexual maturity within a period of 8 to 10 weeks and reaching its maximum size within 6 months. (PETERS, 1859)

The experimental investigations were undertaken in the Curzon Hall precinct of the Dhaka University campus. A total of 40 specimens of fish were procured from the Kataban fish market as well as various drainage systems within the Curzon Hall vicinity and subsequently transferred to designated rearing aquaria. (PETERS, 1859) Males were readily identifiable due to the presence of a modified anal fin that manifests as a gonopodium, whereas females exhibited a less vibrant body coloration accompanied by a distended abdomen. Each aquarium was designed to contain a volume of 8-10 liters of water. Manual water changes were performed bi-daily in the afternoon, specifically when the temperature of the aquarium water approximated that of the municipal tap water. The guppy species demonstrates a preference for hard water and is capable of tolerating salinity levels of up to one ppt. Consequently, a half tablespoon (8g) of salt was systematically dissolved in 20 liters of water during each water change. The broods were provided with a diet consisting of bloodworms, Chironomus sp., mosquito larvae, and commercially available pellet feed, administered bi-daily in the mornings and afternoons. The diameter of the eggs was meticulously measured to estimate fecundity. Twelve ripe females of *Poecilia reticulata* were randomly selected, and fecundity was assessed by enumerating the ova and the various stages of embryonic development through dissection of the abdomen of the gravid female specimens. The developmental stages of the embryos within the gravid females were examined through dissection of the abdomen of the gravid females.

**Keyword:** Guppy fish, Aquarium maintning, fry feeding, Aquarium maintain

## Introduction:

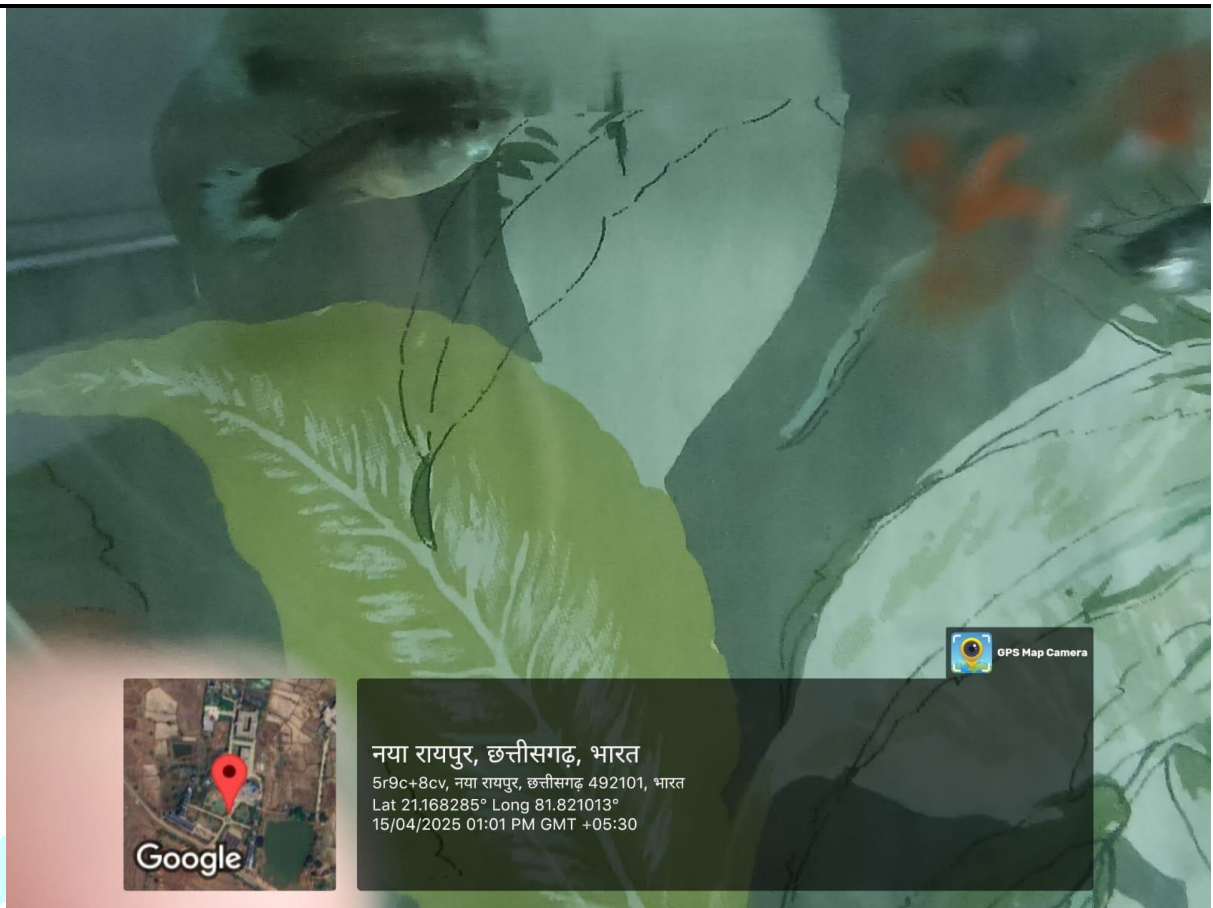
Temperature constitutes one of the most significant determinants influencing the growth rates of guppies and various other ichthyological species. Growth denotes a positive alteration in size and maturation, typically occurring over an extended temporal framework. Temperature serves as a pivotal element in ascertaining growth rate. Growth may manifest as a phase of maturation or as a process leading toward completion or realization. Within natural aquatic ecosystems, fish tend to migrate to deeper waters when surface water temperatures either decrease or exceed their preferred thermal range (Brett, 1979). The temperature exerts its influence on internal physiological mechanisms by modulating the velocity of biochemical reactions (Laurence and Howell, 1981). Paliwal (2016) conducted an investigation into the thermal influences on the fish species *Labeo rajasthanicus*. She observed that the growth of this fish species escalates concomitantly with rising temperatures. Nevertheless, a detrimental impact of elevated temperatures ( $>34^{\circ}\text{C}$ ) was observed on fish survival rates. Temperature not only influences growth rate but also affects feed conversion efficiency, with each species exhibiting a specific optimal thermal range conducive to growth. In warmer habitats, fish experience an extended growing season and accelerated growth rates; however, they often exhibit reduced life expectancy in contrast to cooler aquatic environments (Beschta et al., 1987). Elevated water temperatures enhance metabolic rates, leading to an increased demand for sustenance. The growth and viability of fish are maximized within a specific thermal range (Gadowaski and Caddell, 1991). Guppy fish breeding is a popular and enjoyable hobby, especially because guppies are easy to breed and come in many bright, beautiful colors. Unlike fish that lay eggs, guppies are livebearers, which means the female gives birth to tiny, freeswimming baby fish called fry.

or three females. The male shows off his fins and does a kind of wiggly dance to impress the females. Once mating happens, the female carries the developing fry inside her for about 28 to 30 days. When she's close to giving birth, you can To start breeding, most people keep one male guppy with two often see a dark spot near her tail (called a gravid spot), and her belly will look larger.

A single female can give birth to around 20 to 40 fry at once, and bigger females usually have more babies. Interestingly, female guppies can store sperm, so they can have more babies later without needing to mate again right away.

Since adult guppies—even the parents—might eat the fry, it's a good idea to move the pregnant female to a separate breeding tank or use a special breeder box before she gives birth. You can also add floating plants or moss to give the babies places to hide. Once they're born, feed the fry tiny amounts of crushed fish flakes, infusoria (microscopic food), or baby brine shrimp several times a day. Keeping their water clean and feeding them often helps them grow strong and healthy.

- **Basic Information:** Guppies are livebearing fish, which means that females give birth to live, free-swimming fry. Guppies are easy to breed, with breeding often happening without special effort when males and females live together.
- **Breeding Frequency:** Female guppies can store sperm and give birth every 30 days, producing 20-50 fry per batch.
- **Ideal Conditions:** Maintain a water temperature between  $78^{\circ}\text{F}$  and  $80^{\circ}\text{F}$  to encourage breeding<sup>3</sup>. For healthy offspring, make sure both parents are healthy adults.
- **Protecting the Fry:** Adult guppies might eat their young, so provide dense plant cover or breeding boxes to protect the fry. Alternatively, move the pregnant female to a separate tank just before she gives birth and remove her after she gives birth.
- **Feeding the Fry:** Feed the fry crushed flakes or baby brine shrimp. During their first weeks of life, clean water and frequent small feedings are essential.



## Materials and Methods:

The experiments were carried out in the Curzon Hall area of the University of Dhaka. A total of 40 guppies were collected—some from the Kataban fish market and others from nearby drains around Curzon Hall—and transferred to rearing aquariums. Male and female fish were distinguished based on physical features: males had a modified anal fin called a gonopodium, while females had duller body coloration and swollen abdomens.

Each aquarium held between 8 to 10 liters of water. The water was manually changed every other day in the afternoon, when the temperature of the tap water matched that of the aquarium. Guppies thrive in hard water and can tolerate salinity levels up to 1 part per thousand (ppt). To maintain this salinity, half a tablespoon (approximately 8 grams) of salt was mixed with every 20 liters of water during each water change. (PETERS, 1859)

The fish were fed twice daily, in the morning and afternoon. Their diet included bloodworms

(*Chironomus* species), mosquito larvae, and commercial pellet fesh

### Aquarium Setup (Tank Size & Equipment)

For breeding guppies, a tank between 10 and 30 gallons is ideal. Make sure to use a gentle filter, such as a sponge filter, to avoid harming or sucking in the newborn fry. If you're using a regular filter, cover the intake with a mesh screen.

You can use sand as a substrate or leave the tank bottom bare—both are fine. Substrate can help reduce stress by giving fry places to hide.

Add plenty of live plants like guppy grass, Java fern, or water sprite. These plants offer cover and make the fry feel safer, which increases their chances of survival.

### Water Conditions

- **Temperature:** Keep the water between 75°F and 82°F (24°C to 28°C).
- **pH:** Aim for a neutral to slightly alkaline level—between 7.0 and 8.2.

- **Hardness:** Moderate water hardness is best, around 8–12 dGH.
- Always use a water conditioner to remove chlorine and harmful chemicals from tap water.

### Feeding

- **Adults:** Feed high-quality dry or frozen foods like flakes, pellets, and brine shrimp. This keeps them healthy and ready to breed.
- and grindal worms.

### Helpful Tools & Equipment

- A small net for gently moving fish.
- Water test kits to regularly check pH, hardness, ammonia, etc.
- Full-spectrum lighting to mimic natural sunlight and help plants thrive.

### Breeding Tips

- Keep more females than males—ideally a 1:2 or 1:3 male-to-female ratio—to reduce stress and encourage breeding.
- use a breeding trap to prevent her from eating the fry.
- Maintain good water quality with regular water changes, especially since fry produce waste quickly and are sensitive to poor conditions.

## Result :

### Breeding Success and Observation

- Guppy fish (*Poecilia reticulata*) breeding is highly successful under basic aquarium conditions. When healthy adult males and females are kept together, breeding often occurs naturally without intervention .
- Guppies are livebearers: females give birth to fully formed, free-swimming fry rather than laying eggs.
- The typical gestation period is 22–30 days, with females showing a dark gravid spot and a noticeably swollen abdomen before giving birth.
- Each brood usually consists of 20–40 fry, but larger females can produce up to 60 or more in a single birth.
- Females can store sperm and produce multiple broods (often seven or more) from a single mating.
- Fry are born active and able to eat immediately; survival rates increase significantly when they are separated from adults or provided with ample hiding spaces such as dense plants or breeding boxes.
- The monthly reproductive activity of guppies (*Poecilia reticulata*) was observed continuously throughout the year, with the exception of December and January, when no births were recorded . Fry birth resumed in February and continued through November, reaching a peak in July. Although only a few females gave birth in February, reproductive activity increased significantly in the following months.
- Comparative studies show variability in breeding seasons across regions and related species. Hidebrand (1921) reported that guppies in the southeastern United States breed from May to as



- late as September or October. Similarly, Davis (1978) observed that *Gambusia affinis*, a close relative of guppy, bred from March to October in southcentral Texas, with peak activity in April.
- In the current study, the gestation period for guppies ranged from 25 to 35 days, averaging 28 days (see Table 1), which aligns with previous findings (Ahmed et al., 1985) that suggested births occur at roughly four-week intervals. In comparison, *G. affinis* has a slightly shorter average gestation period of 23–24 days (Krumholz, 1948).
  - Fertilization in guppies is internal, facilitated by a specialized male anal fin called the gonopodium. During courtship, the male exhibits a characteristic “sigmoid display,” forming an S-shaped posture while positioning himself in front of the female. This behavior mirrors observations in *G. affinis* by Collier (1936) and Paden (1975). Additionally, female guppies show a preference for males with larger and more colorful spots during these displays, as documented by Houde and Endler (1995).

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