

## Guppy, *Poecilia reticulata* Peters, 1859, a model species for behavioral ecology

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The guppy (*Poecilia reticulata* Peters, 1959) (Figure 1) is a small freshwater fish that exhibits a wide range of behavioral peculiarities, making it a fascinating subject of study in the field of behavioral ecology and ethology. We will present in this short paper a synthesis of some key behavioral characteristics observed in guppies.



Figure 1. Guppy, *Poecilia reticulata* Peters, 1859.

**Social behavior.** Guppies are highly social fish that exhibit complex social structures (Allibhai et al 2023). They form shoals or groups, and within these groups, individuals establish hierarchies. Dominance and subordination interactions are common, with dominant individuals having preferential access to resources such as food and shelter (Houde 1997).

**Mate choice and sexual selection.** One of the most well-known behaviors in guppies is their intricate mating rituals (Petrescu & Mag 2006). Females are known to be selective in their choice of mates, often preferring males with vibrant and conspicuous coloration

(Houde 1997). This preference is linked to the concept of sexual selection, where certain traits increase an individual's reproductive success (Lindholm & Breden 2002).

**Coloration and display.** Male guppies are renowned for their vibrant and diverse color patterns. These colors are not only attractive to females but also serve as signals of genetic fitness and health. Males engage in elaborate courtship displays, showcasing their colorful fins and body patterns to attract potential mates (Camargo-dos-Santos et al 2021).

**Anti-predator behavior.** Guppies exhibit various anti-predator behaviors, including rapid and erratic swimming patterns when threatened. They are known for their ability to detect predators and respond quickly to evade capture (Zanghi et al 2023). Additionally, guppies may alter their coloration and reduce conspicuous behaviors in the presence of predators to avoid detection (Houde 1997; Glavaschi et al 2022).

**Learning and memory.** Guppies have demonstrated learning abilities, especially in the context of foraging and predator avoidance. They can learn to associate specific cues with the presence of predators or the availability of food. This ability to learn and remember is crucial for their survival in dynamic aquatic environments (Prentice et al 2022).

**Exploratory behavior.** Guppies display exploratory behaviors, investigating their surroundings and searching for potential food sources. This behavior is essential for locating suitable habitats and resources. Environmental enrichment, such as the presence of novel objects, can stimulate exploratory behaviors in guppies (Petrescu-Mag 2023).

**Reproductive strategies.** Guppies are known for their reproductive versatility. Females can store sperm for extended periods, allowing them to produce multiple broods from a single mating event (Petrescu-Mag 2007a, b; Mag et al 2006). This flexibility in reproductive strategies contributes to their success in a variety of aquatic habitats.

**Agonistic behavior.** Agonistic behaviors, including displays of aggression and submission, are observed among guppies, particularly in the context of competition for resources or mates. These behaviors help establish and maintain social hierarchies within the group (Bruce & White 1995).

**Conclusions.** The behavioral peculiarities of guppies encompass a broad spectrum of social, reproductive, anti-predator, and learning behaviors. The study of guppy behavior provides valuable insights into the mechanisms of evolution, adaptation, and the interplay between ecological factors and individual survival strategies in aquatic environments.

**Conflict of interest.** The author declares no conflict of interest.

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