



COMPREHENDING THE INTELLIGENT CICHLIDS

Sagarika Chaudhuri

CICHLID fishes belonging to the family Cichlidae, order Cichliformes, are considered highly intelligent. These freshwater fishes are occasionally found in brackish water. Distribution covers Central and South America, the West Indies, Africa, Madagascar, Israel, Syria, coastal India, and Sri Lanka. Cichlidae is one of the most species-rich families in freshwaters worldwide. The number of species currently recognised under this family is 1762. Endemic cichlids make up most of the fish fauna in the three African lakes that contain the most species of fish of any lake in the world, namely Lake Malawi, Lake Victoria, and Lake Tanganyika.

Culum Brown from Macquarie University (2004) states, “Fish are more intelligent than they appear. In many areas, such as memory, their cognitive powers match or exceed those of higher vertebrates, including non-human primates”.

There are a few criteria that scientists use to measure the intelligence of fish. These include problem-solving abilities, social behaviour, learning and memory, and the ability to adapt to changing environments. Cichlids score high in these areas, so they are considered among the most intelligent fish. Performance showing the intelligence of these fishes are:

- Cichlids can learn from the environment and adapt themselves accordingly. They have comparatively large brains compared to other fish and can perform complex behaviours. Cichlids are also known for their ability to learn and remember complex tasks.
- They have been observed to use tools.
- They can recognise their owners and are able to perform tricks to fulfil their objectives.
- Studies showed that a cichlid fish shares with some higher vertebrates the ability to use transitive inference, i.e. the ability to conclude that if $A > B$ and $B > C$, then $A > C$. A model system based on comparing cichlids in African rift lakes showed that brains and cognition have been shaped by both the physical and social environment.
- According to an experiment conducted on the cichlid fish, *Simochromis pleurospilus*, subjected to an environmental change in the form of a change in food ration early in life, the cognitive abilities of the fish were enhanced later in life.
- Males of many mouth-brooding cichlids of Lake Malawi and Lake Tanganyika build sand cones with flattened or



Discus



Convict cichlid



Oscar

crater-shaped tops. These help in species recognition and impress females.

- White-spotted cichlids were observed to hit a floating thermometer inside an aquarium at least hundreds of times playfully to make it wobble and bob.
- Death feigning, a form of deception, is a way to attract prey. The predatory cichlid of Lake Malawi pretends to be dead while remaining stationary with its abdomen on the sand. Other predatory cichlid varieties, some African and South American cichlids, fell through the water column and remained immobile for several minutes. Their colour patterns represent rotting carcasses. Inquisitive fishes come near, get suddenly attacked by the pretending predator, and fall prey.

According to Mary Allen (2023), an aquarist and keen observer of fish behaviour, the smartest of all cichlids is the Convict cichlid. Other highly intelligent and smart cichlids are Frontosa cichlid, Angelfish, Discus, Oscar and Green terror.

Convict cichlid (*Amatitlania nigrofasciata*): of Central America stands out as the smartest cichlids. These fishes can communicate with each other using various cues and body language. These convey messages and coordinate their behaviour to achieve a goal. Convict cichlids are known for their ability to solve problems. They can perform complex social behaviour, are adaptable, and thrive in various environments. The male and female convict cichlids clean a place and dig a depression in the substrate near a rock or cave. After eggs are laid and fertilised, the female will fan the eggs, whereas the male guards them.

Frontosa cichlid (*Cyphotilapia frontosa*): of Africa, endemic to Lake Tanganyika, exhibits complex social behaviour. They can recognise their owners. Frontosa cichlids are great problem solvers and have been observed to use tools. Females deposit eggs in sand pits between the rocks. After the eggs hatch, the male defends the territory and the female takes the eggs in her mouth.

Angelfish (*Pterophyllum altum*, *Pterophyllum leopoldi*, *Pterophyllum scalare*): of South America are known for their intelligence. They are also quick learners.

Discus (*Symphysodon aequifasciatus*, *Symphysodon discus*, *Symphysodon tarzoo*): of South America are very social and form strong bonds with their owners. These fishes are also known for their intelligence and ability to recognise faces. Female discus fish secrete a whitish milk-like substance from the skin to nurse their young.

Oscar (*Astronotus ocellatus*): of South America is very adaptable and can learn tricks. These fishes are known to perform for their owners. Both male and female fish clean a suitable spawning site with a plant's flat rock or branches, then excavate a circular nest in shallow water.

Green terror (*Andinoacara rivulatus*): of South America is very attentive and protective of its young people. These intelligent egg layer cichlids choose and clean a flat rock for laying eggs.

According to ichthyologists and aquarists who keenly observe the behaviour of cichlids, the cichlids should get a proper healthy diet in the required amount to keep their brain functioning at its best. These fishes should have plenty of mental stimulation, including toys, puzzles, and games challenging their problem-solving abilities. To keep them active mentally and physically, cichlids kept in aquariums should be provided with different types of plants, rocks, hiding places, and new things to discover.

Ms Sagarika Chaudhuri, Former Associate Professor of Zoology at Sree Chaitanya College, Habra, West Bengal. Email: sagarikachaudhuri@yahoo.co