

Archerfish *Toxotes jaculator*

Classification

Class: Actinopterygii

Order: Perciformes

Family: Toxotidae

Genus: *Toxotes*

Species: *jaculator*

Distribution

They are found in southeast Asia, from India to the Philippines, Indonesia, Vanuatu, the Solomon Islands and New Guinea. Some species are found in northern Australia.

Habitat

Archerfish inhabit river estuaries and brackish coastal waters of Asia and in the mangrove swamps and river mouths of northern Australia. The archerfish swim among the roots, preying on insects that land on the vegetation.

Physical Description

- Archerfish are small surface-dwelling fish with a very distinctive appearance.
- All six species are deep bodied, laterally compressed fish with large, forward facing eyes and a flattened head.
- They have small scales that extend onto their fins with a single dorsal fin near the rear.
- Their profile from the tip of the snout to the dorsal fins is almost straight.
- Their coloration is white or silvery with black dorsal banding, usually five to seven bands.
- Maximum length is approximately 12 inches (25 cm).
- They have a large protractile mouth with a grooved palate and large projectile jaws; their lower jaw is longer than their upper jaw.

Diet

What Does It Eat?

In the wild: Archerfish are essentially carnivorous. Their diet is mainly insects, small aquatic crustaceans, insect larvae and zooplankton. Some floating vegetable material such as plants pollen, flower buds and pulpy fruits and also ingested.

At the zoo: Fish pieces, insects and insect larvae and vegetable matter.

Social Organization

Juveniles congregate in calm water in small schools of a dozen or so, swimming just below the surface around submerged roots, sunken debris and below overhanging branches. Adults may roam considerable distances along the shoreline sometimes hunting in groups of four or five. Archerfish are diurnal, most active during the day when there is enough light to see its prey through the murky swamp water. At night it rests motionless among the mangrove roots and debris, which offer some protection from large predators.

Life Cycle

The fry hatch and drift downstream toward the swamp, where they gather in small schools in the shelter of overhanging branches. Individuals attain three to four inches (7-9 cm) in length after about six months. The young must learn to hunt for themselves, since the mature fish do not raise them. It takes time before the juvenile's master shooting their water jets with any accuracy. In the meantime, they will eat zooplankton and small insects like mosquitoes and gnats floating on the surface to survive. Many fry are eaten by larger fish so few survive the one to two years they need to become mature adults.

Adaptations

Spitting sharpshooters

Most fish that feed on insects must rely on them falling, landing or being blown into the water. The archerfish has an adaptation that enables it to shoot and catch insect prey. In fact, they are known as “spitting sharpshooters,” able to shoot down insects up to five feet (1.5 m) above the water by spitting a jet of water from its mouth. This is amazing given the index of refraction compensation necessary for accurately aiming through the water-air interface.

“Shooting” is made possible because archerfish have specially adapted mouths and eyesight. They have an elongated mouth that has an internal channel through which water can be forcefully pumped using powerful jaw muscles. There is a deep groove that runs along the roof of the mouth and a ridge along the top of the tongue that fits into this groove. When an archerfish shoots a jet of water, it raises its tongue against the roof of the mouth forming a tube (like the barrel of a gun). The gill covers are then quickly closed which forces the water along the tube. The tip of the tongue acts as a valve.

Their eyes face forward, giving better binocular vision to judge distances accurately. When it spots a potential target, the archerfish tries to swim directly beneath it to minimize distortion. Its body shape combined with the dorsal fin well back on the body, allows the fish to swim very close to the surface and look upwards without creating surface disturbance. Once in range, the archerfish fires a jet of water, knocking the victim off its perch and into its waiting jaws. It shoots its jet with such force that it stings if it hits human flesh. When the fish fails to shoot down its prey, it is able to leap out of the water (up to one foot) to snatch the insect.

Conservation Connection

Though archerfish are fairly common at this time, their numbers are decreasing due to destruction of mangroves, shrimp farming practices and collection for the pet trade. Shrimp ponds, created in mangroves, introduce pesticides and deplete the water of oxygen.

STATUS

Widely distributed at this time

Fun Facts

- Archerfish have a mouth like a squirt gun, able to shoot a jet of water up to five feet.
- These fish are called “spitting sharpshooters.”
- Eyes face forward so they can swim up under prey for a better shot.
- Two submarines of the United States Navy have been named USS *Archerfish*, the first one holding the distinction of sinking the largest ship ever destroyed by a submarine, the 68,059-ton Japanese aircraft carrier *Shinano*, on November 29, 1944.