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Conscious Fish?

Text by Ila France Porcher

For decades, the question of whether fish feel pain has been stalled by a deeper, largely unexamined assumption: that fish, along with other "low", "cold" animals, are not conscious. This raises an immediate contradiction, for how can a creature experience pain without being aware of it?

Pain, by its very nature, is a subjective experience—something felt. To argue that fish feel pain, but are not conscious, is to separate sensation from awareness in a way that collapses under scrutiny.

This conceptual impasse has not emerged in a vacuum. It has been reinforced by a long-standing bias that portrays fish as simple, mechanical robots—reflex-driven organisms that lack any intrinsic importance. This view has been amplified, and in many cases actively promoted, by sectors of the fishing industry, where acknowledging the consciousness and suffering of fish would carry profound ethical consequences.

Yet, while the idea that fish are as sensitive as logs persists in popular thought, the scientific evidence has been steadily moving in the opposite direction. Over the past decades, a growing body of research has revealed that fish possess not only the neurological structures necessary for conscious experience, but the behavioural complexity that would be considered to indicate consciousness in mammals.

Only the bias against fish has continued to deny it.

The cognitive case for fish consciousness

One of the most compelling lines of evidence for consciousness in fish comes from the behaviour of the cleaner wrasse. These small reef fish engage in intricate social interactions with "client" fish as they remove parasites from their bodies. Researcher Redouan Bshary reports that full-time cleaners may have as many as 2,300 interactions per day with clients belonging to 100 different species, which is far more than any human, in any culture.

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Conscious

With a head-shaking signal, groupers recruit moray eels to hunt with (far left). Lionfish (left) have been found to use flared fin displays to recruit others in cooperative hunting (Lönnstedt OM, et al. Biol Lett. 2014). Cleaner wrasse cleaning pufferfish (below). Cleaner wrasse can recall individual clients, change behaviour when watched and strive to maintain their reputations, indicating a social "image".

These small fish navigate a complex social world. They remember individual clients, adjust their behaviour depending on whether they are being observed and take steps to preserve their reputations in the eyes of their clients, suggesting a social "image".

Cleaner wrasse have passed a version of the mirror self-recognition test, long considered a benchmark of self-awareness and previously passed only by a handful of species, including great apes, dolphins, elephants, ants and, sometimes, mice.

In controlled experiments, after becoming familiar with the presence of a mirror, blobs of coloured gel were placed on the wrasses' faces, and they tried to scrape them off when they saw their reflections. This is considered to show that they are self-aware, and, therefore, conscious.

In other studies, fish were seen to compare themselves with others. On watching fish of their own species fight, individuals assessed their own status and compared it with their assessments of each of the fighters. This affected their actions when they were faced with the victor or the loser of the fights. Their actions showed not only self-awareness but also self-assessment.

Another remarkable example of complex fish behaviour is cooperative hunting by groupers and giant moray eels. Groupers actively recruit the eels by performing a specific head-shaking signal. If the eel responds, the two predators swim side by side, so close that at times they touch, while searching for prey. Then, the eel, with its long, flexible body, sneaks through coral formations, flushing out prey, while the grouper waits outside to catch them. This behaviour requires communication, role differentiation and an understanding of a very different partner's abilities, traits associated with advanced cognition.

Tool use offers another window into fish intelligence. The archerfish is famous for its ability to shoot jets of water to knock insects off branches above the water's surface. The species that have been studied were found to aim these jets with extraordinary precision. The fish not only adjust the force of their blast according to the size of their prey, but also refine their aim depending on whether the insect is stationary or in motion. They must also compensate for the way the light bends at the water's surface, and this angle of refraction changes depending on temperature and salinity. The performance of the archerfish, therefore, requires highly complex cognition.

Memory and learning in fish are also far more sophisticated than once believed. Fish can memorise and navigate complex environments, remember locations of food sources, build nests using thousands of stones and smash open shellfish with rocks. They display a variety of ingenious methods when eating spiny sea urchins, while salmon demonstrate long-term memory spanning many years.

All of these examples of complex cognition, and fish are capable of many more, imply a focused consciousness that is doing the thinking.

Pain, experience and ethical implications

If consciousness is understood as the capacity to have subjective experiences—to feel and perceive while making ongoing decisions in the pursuit of a life—then the accumulating evidence suggests that fish meet this criterion. Their behaviour is not rigid or reflexive. It is flexible, context-dependent and often surprisingly nuanced.

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This brings us back to the question of pain. Fish possess nociceptors, which are specialised nerve cells that detect tissue damage. These send signals of injury through nerves to the brain, at which point the

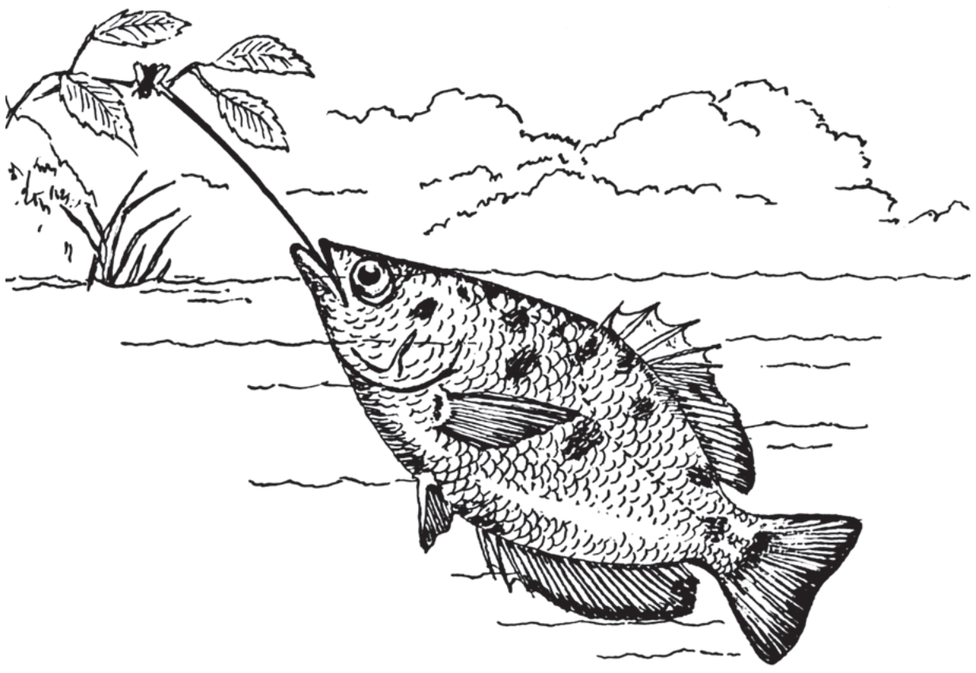
A potential form of tool use has been documented in orange-dotted tuskfish (right), as they strike clams against coral to crack them open (**Wikipedia**). Archerfish shoot remarkably precise jets of water to knock insects off branches above the water's surface, adjusting force based on the prey's weight and movement, and even compensating for the angle of light refraction, a feat that requires highly complex cognition (below).

entire brain lights up. After the initial effort to escape the cause of the pain, fish try to avoid further suffering, in all the ways that we and other conscious animals do.

While in pain, they may rub the affected area, stop eating and moving around and exhibit other signs of distress. These symptoms are relieved by painkillers, which completes the cycle by showing that their changed behaviour was due to their pain.

This is not what an unconscious, reflex reaction looks like. It is what an intense, conscious experience looks like. Fish do not merely twitch when damaged—they suffer.

The reluctance to acknowledge the suffering of fish may say more about human psychology than fish biology. Fish are evolutionarily distant from us. They lack expressive faces and familiar vocalisations. Their suffering is silent, their expressions alien, especially when only viewed in the fish market. It is easier to assume they do not feel pain than to face the ethical implications of the way they are being treated. The fishhook was invented in the Stone Age, yet it is still in use, and those who use it are primarily those who deny fish's suffering.



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A shift in perspective

The question is no longer whether there is any evidence for fish consciousness. There is. The question is how much evidence is enough to reconsider long-held assumptions.

Science rarely delivers absolute proof of subjective experience in another being—whether fish, mammals or even other humans. Instead, it builds a case from converging lines of evidence: neurological, behavioural and evolutionary. In the case of fish, those multiple lines of evidence have converged on the conclusion that they are intelligent, conscious animals. Indeed, the ability to feel pain is ancient—the last common ancestor shared by fish and humans could already feel pain, and suffer!

To continue to deny the possibility of fish consciousness and suffering is not a neutral position. It is a choice—one that carries consequences, not only for how we understand other life forms, but for how we treat them.

And perhaps the most important shift is this: Instead of asking whether fish are conscious enough to deserve consideration, we might begin by asking whether we have been wrong to exclude them. Once we know that fish feel and suffer, the question is no longer what they are, but who we choose to be. ■

*Ethologist **Ila France Porcher**, author of **Yes, Fish Feel Pain**, **The True Nature of Sharks**, and six other books on wildlife behaviour, spent 15 years closely observing fish and shark behaviour in Tahiti, resulting in several scientific papers. Her writings are based on decades of first-hand observations of wildlife and focus on the individuality and intelligence of individuals, challenging traditional views of animal minds. Her work has been featured on* Shark Week*, in scientific discussions, conservation debates and international media for its unique blend of field observation, art and science.*

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