

# Do fish feel pain?

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The hook of a fishing lure is stuck in the upper jaw of this rainbow trout. Whether the animal feels pain is not verified beyond any doubt. Credit: Alexander Schwab

Fish do not feel pain the way humans do. That is the conclusion drawn by an international team of researchers consisting of neurobiologists, behavioural ecologists and fishery scientists. One contributor to the landmark study was Prof. Dr. Robert Arlinghaus of the Leibniz Institute of Freshwater Ecology and Inland Fisheries and of the Humboldt University in Berlin.

On July 13th a revised animal protection act has come into effect in

Germany. But anyone who expects it to contain concrete statements regarding the handling of [fish](#) will be disappointed. The legislator seemingly had already found its answer to the fish issue. Accordingly, fish are sentient vertebrates who must be protected against cruel acts performed by humans against animals. Anyone in Germany who, without due cause, kills [vertebrates](#) or inflicts [severe pain](#) or suffering on them has to face penal consequences as well as severe fines or even prison sentences. Now, the question of whether or not fish are really able to feel [pain](#) or suffer in human terms is once again on the agenda. A final decision would have far-reaching consequences for millions of anglers, fishers, aquarists, fish farmers and fish scientists. To this end, a research team consisting of seven people has examined all significant studies on the subject of fish pain. During their research the scientists from Europe, Canada, Australia and the USA have discovered many deficiencies. These are the authors' main points of criticism: Fish do not have the neuro-physiological capacity for a [conscious awareness](#) of pain. In addition, behavioural reactions by fish to seemingly painful impulses were evaluated according to human criteria and were thus misinterpreted. There is still no final proof that fish can feel pain.

## **This is how it works for humans**

To be able to understand the researchers' criticism you first have to comprehend how [pain perception](#) works for humans. Injuries stimulate what is known as nociceptors. These [receptors](#) send electrical signals through nerve-lines and the spinal cord to the cerebral cortex (neocortex). With full awareness, this is where they are processed into a sensation of pain. However, even severe injuries do not necessarily have to result in an experience of pain. As an emotional state, pain can for example be intensified through engendering fear and it can also be mentally constructed without any tissue damage. Conversely, any stimulation of the nociceptors can be unconsciously processed without the organism having an experience of pain. This principle is used in

cases such as anaesthesia. It is for this reason that pain research distinguishes between a conscious awareness of pain and an unconscious processing of impulses through nociception, the latter of which can also lead to complex hormonal reactions, behavioural responses as well as to learning avoidance reactions. Therefore, nociceptive reactions can never be equated with pain, and are thus, strictly speaking, no prerequisite for pain.

## **Fish are not comparable to humans in terms of anatomy and physiology**

Unlike humans fish do not possess a neocortex, which is the first indicator of doubt regarding the pain awareness of fish. Furthermore, certain nerve fibres in mammals (known as c-nociceptors) have been shown to be involved in the sensation of intense experiences of pain. All primitive cartilaginous fish subject to the study, such as sharks and rays, show a complete lack of these fibres and all bony fish – which includes all common types of fish such as carp and trout – very rarely have them. In this respect, the physiological prerequisites for a conscious experience of pain are hardly developed in fish. However, bony fish certainly possess simple nociceptors and they do of course show reactions to injuries and other interventions. But it is not known whether this is perceived as pain.

## **There is often a lack of distinction between conscious pain and unconscious nociception**

The current overview-study raises the complaint that a great majority of all published studies evaluate a fish's reaction to a seemingly painful impulse - such as rubbing the injured body part against an object or the discontinuation of the feed intake - as an indication of pain. However, this methodology does not prove verifiably whether the reaction was due

to a conscious sensation of pain or an unconscious impulse perception by means of nociception, or a combination of the two. Basically, it is very difficult to deduct underlying emotional states based on behavioural responses. Moreover, fish often show only minor or no reactions at all to interventions which would be extremely painful to us and to other mammals. Pain killers such as morphine that are effective for humans were either ineffective in fish or were only effective in astronomically high doses that, for small mammals, would have meant immediate death from shock. These findings suggest that fish either have absolutely no awareness of pain in human terms or they react completely different to pain. By and large, it is absolutely not advisable to interpret the behaviour of fish from a human perspective.

## What does all this mean for those who use fish?

In legal terms it is forbidden to inflict pain, suffering or harm on animals without due cause according to §1 of the German Animal Protection Act. However, the criteria for when such acts are punishable is exclusive tied to the animal's ability to feel pain and suffering in accordance with § 17 of the very same Act. The new study severely doubts that fish are aware of pain as defined by human terms. Therefore, it should actually no longer constitute a criminal offence if, for example, an angler releases a harvestable fish at his own discretion instead of eating it. However, at a legal and moral level, the recently published doubts regarding the awareness of pain in fish do not release anybody from their responsibility of having to justify all uses of fishes in a socially acceptable way and to minimise any form of stress and damage to the fish when interacting with it.

**More information:** Rose, J. et al. Can fish really feel pain? *Fish and Fisheries*, [DOI: 10.1111/faf.12010](https://doi.org/10.1111/faf.12010) [onlinelibrary.wiley.com/doi/10.1111/faf.12010/abstract](https://onlinelibrary.wiley.com/doi/10.1111/faf.12010/abstract)

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