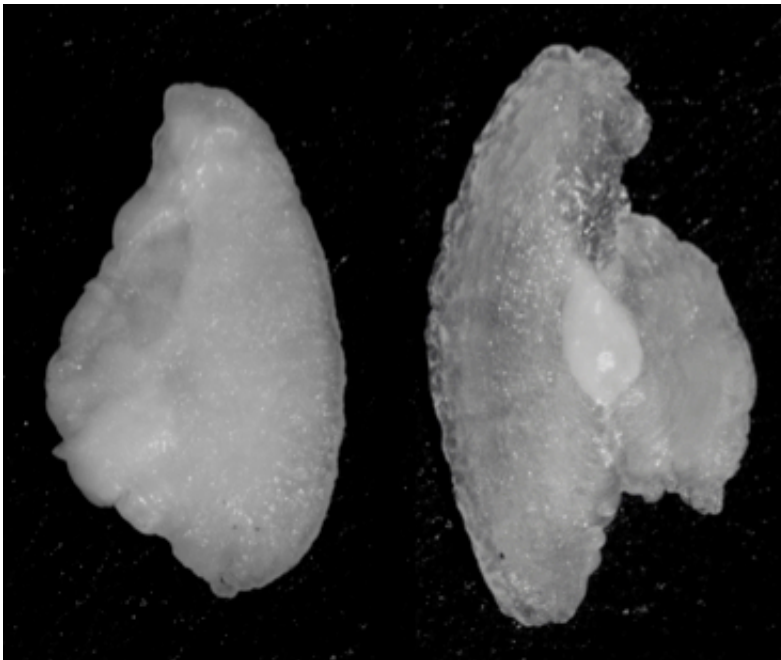


Hear no evil: Farmed fish found to be hard of hearing

April 28 2016



The left and right earbones of a juvenile farmed salmon. The left one is normal, and the right one is deformed. The deformed earbone is larger and more opaque. Credit: Tormey Reimer

New research published today in the journal *Scientific Reports* has revealed for the first time that half of the world's farmed fish have hearing loss due to a deformity of the earbone.

Like humans, [fish](#) have ears which are essential for [hearing](#) and balance, so the findings are significant for the welfare of farmed fish as well as

the survival of captive-bred fish released into the wild for conservation purposes.

The University of Melbourne-led study found that half of the world's most farmed [marine fish](#), Atlantic [salmon](#), have a deformity of the otolith or 'fish earbone', much like the [inner ear](#) of mammals. The deformity was found to be very uncommon in [wild fish](#).

Lead author Ms Tormey Reimer said farmed fish are 10 times more likely to have the deformity than wild fish.

"The deformity occurs when the typical structure of [calcium carbonate](#) in the fish earbone is replaced with a different crystal form. The deformed earbones are larger, lighter and more brittle, and the way they perform within the ear changes," Ms Reimer said.

"The deformity occurs at an early age, most often when fish are in a hatchery, but its effects on hearing become increasingly more severe as the fish age.

"Our research suggests that fish afflicted with this deformity can lose up to 50% of their hearing sensitivity."

To test if the deformity was a global phenomenon, researchers from the University of Melbourne and the Norwegian Institute for Nature Research sampled salmon from the world's major salmon producing nations: Norway, Canada, Scotland, Chile and Australia.

The team compared the structure of the otoliths from farmed and wild salmon. They also compared the hearing of the fish using a model that predicts what a fish can hear.

Regardless of the country where salmon were farmed, the deformity was

much higher in [farmed fish](#) than wild fish.

"This study raises questions about the welfare of farmed animals and could explain why some conservation programs aren't working" said co-author Assoc. Prof. Tim Dempster from the School of Biosciences, University of Melbourne.

"Something about the farming process is causing the deformity. We now need to work out what is the root cause to help the global salmon industry produce fish with acceptable welfare standards." Over two million tons of farmed salmon are produced every year, with more than a billion fish harvested.

"We estimate that roughly half of these fish have the earbone deformity, and thus have compromised hearing. We don't yet know exactly how this hearing loss affects their performance in farms.

However, producing farmed animals with deformities contravenes two of the "Five Freedoms" that forms the basis of legislation to ensure the welfare of farmed animals in many countries," added Ms Reimer.

Deformed earbones could also explain why many fish conservation programs aren't performing as expected.

Every year, billions of captive-bred juvenile salmon are released into rivers in North America, Asia and Europe to boost wild populations, but their survival is 10-20 times lower than that of wild salmon.

Hearing loss may prevent fish from detecting predators, and restrict their ability to navigate back to their home stream to breed.

Study co-author Prof Steve Swearer from the University of Melbourne said that the poor performance of restocked fish has been a long-

standing mystery.

"We think that compromised hearing could be part of the problem. All native fish re-stocking programs should now assess if their fish have deformed earbones and what effect this has on their survival rates," Prof. Swearer said.

"If we don't change the way fish are produced for release, we may just be throwing money and resources into the sea."

Provided by University of Melbourne

Citation: Hear no evil: Farmed fish found to be hard of hearing (2016, April 28) retrieved 20 March 2024 from <https://phys.org/news/2016-04-evil-farmed-fish-hard.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--