

# Surprising discovery about weta ears reveals similarity with whales

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Male Wellington tree weta (*Hemideina crassidens*). Credit: Tony Wills / Wikimedia

(Phys.org)—Research in the iconic, and some say maligned, New Zealand weta is challenging ideas about how a large group of insects including crickets and katydids hear, and has revealed an unexpected similarity to whale hearing.

Scientists from the School of [Biological Sciences](#) at The University of Auckland, with colleagues from Plant & Food Research in New Zealand

and the University of Strathclyde in Scotland, have discovered that weta rely on a unique lipid (a compound that includes oils and fats) to hear the world around them.

"In the weta, as in other members of the Ensiferan group which includes katydids and [crickets](#), sound is detected by ear drums on the front legs," explains Dr Kate Lomas from The University of Auckland who led the research.

The sound is known to be transmitted through a liquid-filled cavity to reach the hearing organs, but until the current research was done it was presumed that the liquid was simply the insect equivalent of blood (called haemolymph).

The researchers found that it was in fact a lipid of a new chemical class. They believe the role of the lipid is to efficiently transmit sound between compartments of the ear, and perhaps to help amplify quiet sounds.

Whales are the only other creatures known to use lipids to hear: with no external [ears](#) they use lipid-filled cavities in their jaw to detect sound vibrations in the water.

Using new tissue analysis and three-dimensional imaging techniques the scientists also discovered a tiny organ in the [insects'](#) ears, which they named the olivarius after Dr Lomas' son Ollie. The organ appears to be responsible for producing the all-important lipid.

It may have been overlooked in previous studies because standard analytical techniques, which are much harsher, would have damaged or destroyed the fragile tissue. "The ear is surprisingly delicate so we had to modify how we looked at its structure and in doing so we discovered this tiny organ," says Dr Lomas.

The researchers did their work with the Auckland tree weta. They believe that the same method of hearing is likely to be used by other members of its biologic class, including crickets and katydids, which are famous for the sounds they produce.

"We suspect that the use of lipid in insect ears is much more common than previously realised and that other researchers in the field may need to rethink how these animals hear," says Associate Professor Stuart Parsons from The University of Auckland.

As to why both weta and [whales](#) – creatures that couldn't be further apart in terms of their biology or public appeal – use lipids to hear: "The short answer is we don't know, though it's likely they both converged on a very similar solution to a similar problem," he says.

**More information:** [dx.plos.org/10.1371/journal.pone.0051486](https://doi.org/10.1371/journal.pone.0051486)

Provided by University of Auckland

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