Hearing on the wing: New structure discovered in butterfly ears

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Menelaus Blue Morpho, Morpho menelaus. Image: Wikipedia.

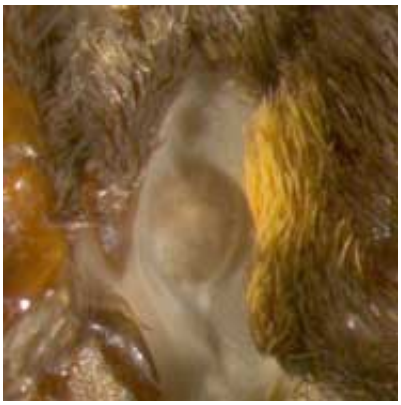
(PhysOrg.com) -- A clever structure in the ear of a tropical butterfly that potentially makes it able to distinguish between high and low pitch sounds has been discovered by scientists from the University of Bristol, UK.

The team believes that the remarkable structure may be associated with the detection of predators, in particular birds. The Blue Morpho butterflies (*Morpho peleides*), native to Central and South America, are more famous for their amazing wing colouration and now turn out to have ears on their wings.

The simple ear sits at the base of the wing and looks like a sheet of

stretched rubber. This oval-shaped tympanal membrane, with an unusual dome in the middle, is attached directly to sensory organs and is responsible for converting sound waves into signals that can be picked up by nerve cells.

Using a tiny laser beam, lead researcher Katie Lucas scanned the surface of the membrane while it was in action, and found that lower pitch sounds cause vibrations only in a part of the outer membrane while higher pitch sounds caused the entire membrane to vibrate.



Close up showing the structure of the ear of the Blue Morpho butterfly. Photo by Katie Lucas

The unusual structure and properties of the membrane mean that this butterfly ear may be able to distinguish between low and high pitch sounds, and measurements of nerve recordings suggested the butterfly is more sensitive to lower pitches. Butterfly hearing is unusually sensitive to low pitch sounds compared to other insects with similar ears.

The structure of the membrane could mean the butterfly can hear a greater range of pitches, which as Katie Lucas and her colleagues

postulate, may enhance the abilities of these butterflies to listen for birds. The team suggest that sensitivity to lower pitch sounds may detect the beating of birds' wings, while higher pitches may tune into birdsong.

More information: Auditory mechanics and sensitivity in the tropical butterfly Morpho peleides (Pampilionoidea, Nymphalidae) by Kathleen M. Lucas, James F. C. Windmill, Daniel Robert and Jayne E. Yack *The Journal of Experimental Biology*

Source: University of Bristol (news : web)