

New study uncovers secrets behind butterfly wing patterns

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Heliconius Erato: A Heliconius butterfly in Panama

The genes that make a fruit fly's eyes red also produce red wing patterns in the Heliconius butterfly found in South and Central America, finds a new study by a UC Irvine entomologist.

Bob Reed, assistant professor of ecology and evolutionary biology, discovered that genes involved in making insect eye pigments evolved over time to also make wing pigments in butterflies. This finding sheds light on the genetic causes of wing patterns and why, in the Heliconius, those patterns can vary widely from region to region.

"We found that evolution is achieved primarily through recycling old genes into new functions, as opposed to evolving entirely new genes from scratch," Reed said.

Results of the study appear online this week in the *Proceedings of the Royal Society B*.

Within one species of the butterfly genus Heliconius, more than 20 distinct wing patterns can exist in different geographic regions. Over time, the Heliconius evolves to look like local unrelated

butterfly species that are poisonous to birds, a phenomenon called mimicry.

"It is a very basic textbook example of natural selection," Reed said. "If you look like you're poisonous, you're not going to get eaten and you can produce offspring."

Reed's study also explains under which conditions certain genes will cause a stripe on a Heliconius wing to become yellow or red.

W. Owen McMillan of the University of Puerto Rico and Lisa M. Nagy of the University of Arizona also worked on this study, which was funded by the National Science Foundation and a University of Arizona IGERT genomics fellowship.

UC Irvine has two additional butterfly experts -- Adriana Briscoe, who studies butterfly eyes and color vision, and Tony Long, who studies eyespot patterns on butterfly wings. All three scientists are members of the Department of Ecology and Evolutionary Biology in the School of Biological Sciences.

Source: University of California - Irvine

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