

13 October 2006

By: Stefan Anitei, Science Editor



[A Supergene Controls Butterfly's Wing Color Pattern](#)

This acts like a "developmental switching mechanism"

Many butterfly species achieve some interesting convergent morphologies in order to survive. Nonpoisonous species may have wing patterns which are similar to toxic species avoided by predators, a tactic called mimicry. Scientists have studied the genetic mechanisms behind the molecular mimicry in three species of *Heliconius* genus. Two distantly related species (*H. melpomene* and *H. erato* (photo center above)) had similar wing patterns and a third species, *H. numata* (photo center below), closely related to *H. melpomene* (photo above), possesses a very different wing pattern. *Heliconius* is a genus of harmless butterflies, and each *Heliconius* species imitates a poisonous species of the *Melinaea* genus (photo below *M. scylax*). Previous studies already located gene loci responsible in part to determine the wing patterns and coloration. To determine the genetic background of the color models, the researchers used cross breeding of different morph variations of each species and identified the genotype (the combination of gene which produce a certain morph) of the offspring in order to identify genes which determine the color patterns. They determined three genes to determine the color pattern in *H. melpomene*, and one distinct gene for *H. erato* and *H. numata*. All the five genes determined were distinct. Using molecular markers, the research team found that the loci where these genes are situated on the chromosomes were exactly in the same location for all these three species. It seems that in *Heliconius* butterflies there is a "supergene" region responsible for producing wing pattern diversity. This locus functions like a "jack-of-all-trades flexibility" rather than like a constraining gene. Natural selection activates this "developmental switching mechanism" to respond to a wide range of mimetic pressures by splitting into divergent wing patterns adapted to local imitated species.