'Taste sensor' genes in female butterflies vital to species' survival

July 11 2013

Giving the phrase "Mother knows best" a whole new meaning, UC Irvine researchers have identified unique genes in female butterflies that enable them to select the best host plant for their larvae – and avoid deadly ones.

Biologist Adriana Briscoe and colleagues found that females of the *Heliconius* species express gustatory, or taste, receptor genes when choosing a host on which to lay their eggs. Many plants defend themselves by producing toxic chemicals, so it's vital to their larvae's survival that the butterflies pick the right kind. *Heliconius* females have 80 taste organs called sensilla on their forelegs that they use to sample potential host plants, while male butterflies have none.

"This study is important for understanding the co-evolution of butterfly species and their host plants, uncovers a new set of genes critical to the species' survival, and reveals that female butterfly behavior shapes the hereditary makeup of butterflies," said Briscoe, professor of ecology & evolutionary biology and lead author of the paper, which will be published online July 11 in *PLOS Genetics*.

Heliconius females choose young, robust passionflower vines to host their larvae. They're so selective that they inspect a number of vines multiple times daily for other butterfly larvae and deficient leaves that are not healthy enough to sustain larvae or produce toxic chemicals before deciding on which specific vine to lay their eggs. Healthy passionflower vines are a limited commodity indigenous to rainforests in

Mexico, Central America and South America.

Briscoe and her team have published other studies on butterflies, including a 2010 one in which they found that butterfly species with a duplicate gene allowing them to see ultraviolet colors also have ultraviolet-yellow pigment on their wings, helping them identify appropriate mates in a timely manner.

Provided by University of California, Irvine