Darwin told us so: Researcher shows natural selection speeds up speciation

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In the first experiment of its kind conducted in nature, a University of British Columbia evolutionary biologist has come up with strong evidence for one of Charles Darwin's cornerstone ideas – adaptation to the environment accelerates the creation of new species.

"A single adaptive trait such as color could move a population towards the process of forming a new species, but adaptation in many traits may be required to actually complete the formation of an entirely new species," says UBC post-doctoral fellow Patrik Nosil, whose study is published today in the online journal *PLoS ONE*. "The more ways a population can adapt to its unique surroundings, the more likely it will ultimately diverge into a separate species."

Nosil studied walking-stick insects in the Santa Barbara Chaparral in southern California. Stick insects cannot fly and live and feed on their host plants. Different "eco-types" of walking-stick insects are found on different plants and exhibit different color patterns that match the features of their host plants. For example, insects of the cristinae eco-type, which feed on plants with needle-like leaves, have a white line along their green bodies.

By displacing some eco-types away from their customary host plants and protecting others from their natural predators, Nosil found that color pattern alone could initiate speciation, while natural selection on additional adaptive traits such as the ability to detoxify different host-plant chemicals are required to "seal the deal," or complete the

speciation process initiated by differences in color pattern.

“Natural selection has been widely regarded as the cause of adaptation within existing species while genetics and geography have been the focus of most current research on the driving force of speciation,” says Nosil.

“As far as advancing Darwin’s theory that natural selection is a key driver of speciation, this is the first experiment of its kind done outside of a lab setting. The findings are exciting,” says Nosil.

The *PLoS One* paper, co-authored by Cristina Sandoval of the University of California at Santa Barbara, is available at www.plosone.org/doi/pone.0001907 .

Source: University of British Columbia