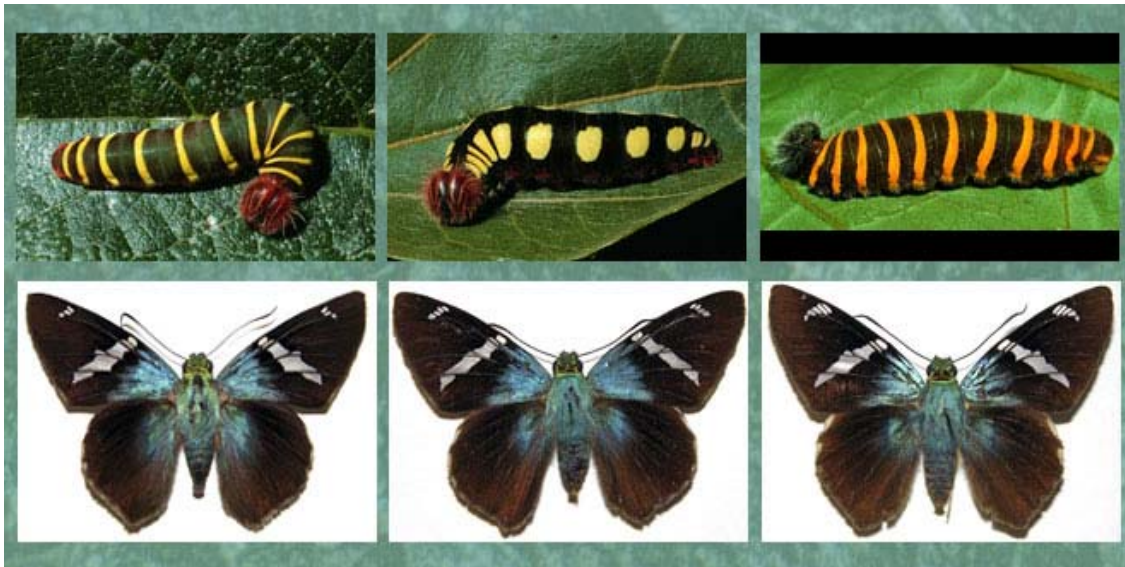


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DNA Barcoders Nab New Species

Biologists dream of hand-held DNA scanners that could tell an ecologist in the field whether or not an organism is a new species. That dream is a long way from fruition, but two new tests of a molecular technique called DNA barcoding suggest that it will become a powerful tool for cataloging the diversity of life.



Hidden diversity. Barcoding allows biologists to identify new butterfly species that have remarkably similar adult forms.

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With species going extinct faster than they can be identified by traditional methods, a group of taxonomists has been developing DNA barcoding to speed up their work. The method focuses on DNA in the energy-generating mitochondria inside cells. Unlike DNA in the nucleus of cells, mitochondrial DNA evolves quickly. Unique changes will accumulate after two populations stop interbreeding, allowing biologists to tell whether two closely related organisms should be considered separate species.

Backers of this approach, including the authors of the new studies, have teamed up to form the Consortium for the Barcoding of Life. To standardize their efforts, they've agreed to use the 648 DNA letters of a mitochondrial gene called *COI* as the barcode marker. Their ultimate goal is to catalog the *COI* sequence of every species on Earth. But before that can happen,

biologists have to make sure the technique is reliable.

The new work suggests that it is. A team led by Mark Stoeckle, a molecular ecologist at Rockefeller University in New York City, barcoded 260 bird species known to reproduce in the United States. Their results, published in the 28 September issue of the *Public Library of Science, Biology*, show that differences in the sequence of the *COI* gene are about 18 times greater between species than within species. Beyond demonstrating that DNA barcoding can distinguish known bird species, they found that four unknown bird species appear to be improperly lumped in with other species.

In a similar study, Daniel Janzen, an evolutionary biologist at the University of Pennsylvania in Philadelphia, and colleagues sequenced mitochondrial DNA from nearly 500 specimens of the tropical skipper butterfly preserved at the Smithsonian National Museum of Natural History in Washington, D.C. DNA barcoding of the specimens reveal 10 species within the tropical skipper group, a classification that had eluded naturalists because the adult forms of the butterflies are so similar, the team reports online this week in the *Proceedings of the National Academy of Sciences*.

Barcoding provides a relatively rapid tool in a field in which "time is an enormous enemy," says Daniel Brooks, an evolutionary biologist at the University of Toronto in Canada. But Brooks cautions that the traditional methods are needed to confirm the designations found by barcoding.

--JOHN BOHANNON

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