

Humidity changes color of birds' feathers, biologists discover

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Tree swallows' iridescent feathers change from blue-green to muted yellow when exposed to humidity. The plumage reverses to previous color tones as humidity decreases.

This discovery by Chad Eliason, a University of Akron integrated bioscience Ph.D. program student, and Dr. Matthew Shawkey, assistant professor of biology and integrated bioscience, is published in the Sept. 27 issue of [Optics Express](#), the international journal of optics.

The finding has implications ranging from technology ([color](#) and vapor sensors) to biology (mate choice), according to the researchers.

Color in iridescent [feathers](#) is created by light scattered from nanoscale structural components (keratin and melanin) of the plumage. The researchers explain separate research that shows that the protein, keratin, absorbs [water vapor](#), which leads to swelling over a range of humidity. Further, the nanoscale arrangement of keratin and melanin at the outer edge of iridescent feather barbules results in coherent scattering of light, thereby producing brilliant, iridescent colors.

Eliason and Shawkey placed iridescent feathers from tree swallows in a small chamber and exposed them to various levels of humidity while measuring their color via spectrometry. This process involved directing a beam of pure white light at the feather and measuring the amount of light at different wavelengths reflected back. A long wavelength, for instance, indicates a red feather while a blue feather reflects a short wavelength.

“We exposed the feathers to different humidity levels and found that the color had changed very rapidly, within two seconds, (from green to yellow) and reversibly with [humidity](#),” Eliason says. “Although we don’t know the function yet, this discovery should stimulate some interesting research.”

Eliason predicts that further research to determine if birds detect and respond to the color change, what function it serves, and how technology might mimic this phenomenon in nature are on the horizon.

More information: “Rapid, reversible response of iridescent feather color to ambient humidity” at www.opticsinfobase.org/oe/abstract.cfm?uri=oe-18-20-21284

Provided by University of Akron

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