

Beak shape can predict nest material use in birds, study finds

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A Zebra Finch (*Taeniopygia guttata*) handling nest material. Credit: Shoko Sugasawa

The material a bird selects for its nest depends on the dimensions of its beak, according to researchers.

Using data on [nest](#) materials for nearly 6,000 species of birds, a team based at the University of Bristol and the University of St Andrews

utilized random forest models, a type of machine learning algorithm, to take data from bird beaks and try to predict what nest materials that species might use.

They found a surprisingly strong correlation. Using only information on beak shape and size, they were able to correctly predict broad nest material use in 60% of species, rising to 97% in some cases.

These findings, published in *Philosophical Transactions of the Royal Society B*, include a careful exploration of these models, investigating the ecological and evolutionary context behind these relationships. For example, not every species has the same access to all nest material types, which also affects these results.

The study's lead author, Dr. Catherine Sheard of Bristol's School of Earth Sciences said, "We know a lot about primate hands, but not as much about how other animals use their limbs and mouths to manipulate objects. We're very excited about the potential applications of our findings, to further explore how beak shape may have co-evolved with other aspects of [nest building](#) or other functions."



A Mute Swan (*Cygnus olor*) building a nest. Credit: Shoko Sugasawa

Dr. Shoko Sugasawa, senior author of the study, based at the University

of St Andrews, added, "Most animals, including birds, do not have hands like ours, but manipulating objects like nest material and food is such a crucial part of their lives. Our finding is the first step to reveal possible interactions between the evolution of beaks and manipulation like nest building, and helps us better understand how animals evolved to interact with the world with or without hands."

The team are now working on a project documenting anthropogenic nest material in the world's birds, trying to understand what type of birds put human-made material (like plastic, wire, or cigarette butts) in their nests. They are in particular looking to see whether this would be linked to urban-dwelling birds.

"I'm also interested in how [beak](#) shape relates to other properties of the nest, including overall nest structure," added Dr. Sheard, "such as whether birds build nests with walls, or a roof."

More information: Catherine Sheard, Beak shape and nest material use in birds, *Philosophical Transactions of the Royal Society B Biological Sciences* (2023). [dx.doi.org/10.1098/rstb.2022.0147](https://doi.org/10.1098/rstb.2022.0147)

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