

For birds, blending in may result in more diversity

April 24 2023, by Jerald Pinson



Himalayan cutias (top) and rufous-backed sibilias (bottom) flock together in western Asia and look remarkably similar, despite belonging to different genera. Credit: Wenyi Zhou

The saying "Birds of a feather flock together" is being given new meaning by a study published in the *Philosophical Transactions of the Royal Society B*. Flocking birds often travel in groups made up of a single species, in which individuals are nearly indistinguishable from one another, as noted by the proverbial adage. But something strange happens in flocks of two or more species from Southeast Asia. Even when flock species are distantly related, they still seem to converge on the same appearance, as if trying to fit in.

"They all share haphazard traits, like crests or yellow bellies, which makes them almost identical. You can't really tell them apart without looking at their markings," said study co-author Scott Robinson, Ordway eminent scholar at the Florida Museum of Natural History.

According to Robinson, this similarity in plumage is likely a type of [mimicry](#), which by itself isn't uncommon in birds. Alfred Russel Wallace, the co-discoverer of natural selection, was the first to suggest that some [bird species](#) engage in mimicry when noting the similarities between orioles and friarbirds in Australia. Birds can mimic one another to reduce aggression from a [dominant species](#); to resemble a more formidable adversary to predators; and, in at least one case, to make themselves appear toxic.

But resemblance in multispecies flocks is something different, said lead author Rebecca Kimball, professor of biology at the University of

Florida.

"In mimicry, you often want to look like something because there's an advantage to being that other thing. You want [species](#) to think you're toxic or low-profitable prey," she said. "In flocking birds, one idea is that this has more to do with a predator's ability to isolate a target. When there are a bunch of birds moving around, it may be easier for predators to identify an individual that has a distinct color pattern."

This idea that unrelated birds find safety in collective obscurity was first proposed in the 1960s for flocks along the Andes Mountains. But follow-up studies failed to show conclusive evidence of mimicry in Andean multispecies flocks, and the theory was largely abandoned.

"The idea sat fallow for a long time," Robinson said. But in 2010, Robinson began working with a Chinese colleague in Yunnan province and observed what appeared to be the same phenomenon that had been described decades earlier.

Robinson and his colleagues spent the next several years documenting similarities in China's multispecies flocks, uncovering the same pattern again and again. While some of the similarities between species are subtle, the authors points to several visually conspicuous examples.

In western Asia, Himalayan cutias (*Cutia nipalensis*) look like they're dressed in mismatched layers, with a mask of black feathers, chestnut wings, and white chests with zebra stripes. This pattern might seem impervious to emulation, yet the rufous-backed sibilias (*Leioptila annectens*) they flock with do a remarkably good impression. Both species have similar behavior, foraging patterns and markings, with the exception of stripes, which the sibilias lack.

Some birds also seem capable of mimicking more than one species as

they mature. Juvenile white-hooded babblers (*Gampsorhynchus rufulus*) have rusty head feathers, brown wings and creamy underbellies, similar to the parrotbills they flock with. Adults look like an entirely different species, with white heads and dark brown wings that resemble white-crested laughingthrushes (*Garrulax leucolophus*), all of which are part of the same flock.

Somewhat counterintuitively, this conformity within multispecies flocks may be contributing to diversity in the region. Not only can birds mimic more than one species at different stages of development, but their appearance can also vary across their range. In eastern China, coal tits tag along with birds with prominent crest feathers, which they mimic. In the Himalayas and Hengduan Mountains farther west, the same species lacks a crest and flocks with other crestless birds.

If these differences persist long enough, Robinson said, it might ultimately result in one species becoming two. "The possible role this type of mimicry plays in speciation is the most interesting idea from our point of view. Many of these birds have huge ranges, and there may be a lot of differentiation in these traits involved in flocking within a species."

There seem to be two main ingredients required to create this type of mimicry in flocks, both of which might help explain why this pattern appears to be so prominent in China but absent elsewhere.

First, Robinson said, a flock must be composed of just a few species, with some more common than others. "When you have a [flock](#) with a really dominant, abundant species, there's a model worth mimicking. If other birds look like that model, they get the same protection, they get access to the same resources, and they get to travel with a compatible group."

In other parts of the world, many flocks have more of an open-door policy, weakening the selective forces that contribute to mimicry. Mating pairs of multiple species join together in patchwork groups, often relying on the warning calls of sentries to avoid predators rather than their ability to fade into the background.

The second ingredient is the winnowing fan of predation. For small to medium flocking birds, the biggest source of danger comes from above, in the form of raptors, and the skies above Southeast Asia are especially fraught. The region encompasses only 3% of Earth's land area, yet it harbors almost 30% of all raptor species. This puts an enormous amount of pressure on flocks, Robinson said, which may promote mimicry.

To determine whether similarity among flocking species is the result of mimicry, the authors say they'll need to conduct widescale genetic analyses to rule out other potential causes.

"Just how widespread mimicry is in birds is something that's only been appreciated recently," Robinson said. "Taxonomy work is based on appearance, with the assumption that birds are closely related if they look similar. Now that we can study DNA, we're realizing they often look alike because they live together."

More information: Rebecca T. Kimball et al, Can convergence in mixed-species flocks lead to evolutionary divergence? Evidence for and methods to test this hypothesis, *Philosophical Transactions of the Royal Society B: Biological Sciences* (2023). [DOI: 10.1098/rstb.2022.0112](https://doi.org/10.1098/rstb.2022.0112)

Provided by Florida Museum of Natural History

Citation: For birds, blending in may result in more diversity (2023, April 24) retrieved 23 April

2024 from <https://phys.org/news/2023-04-birds-blending-result-diversity.html>

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