These birds communicate by fluttering their feathers—and they have different accents

September 22 2020

Fork-tailed Flycatchers are very aggressive birds, so to lure them in, the researchers set up a taxidermy hawk for the flycatchers to attack. The scientists took video and audio recordings of the birds' wing feathers to see how they produced their feather-fluttering sounds. Credit: (c) Valentina Gómez-Bahamón, Field Museum

Birds tweet, squawk, chirp, hoot, cluck, and screech to communicate with each other. Some birds have found another way to talk, though:

they make sounds by fluttering their feathers or smacking their wings together really fast. Scientists just discovered another species that makes sounds with its feathers, a bird from the American tropics called the Fork-tailed Flycatcher. And by analyzing recordings of the birds in flight, the researchers found that subspecies with different migration patterns have different "dialects" to their feather sounds, possibly helping contribute to them splitting into separate species.

"We already knew from past genetic analysis that the two groups are becoming different species, so we wanted to know if there were any differences in the sounds that the males produce with their wings," says Valentina Gómez-Bahamón, a researcher at Chicago's Field Museum, a Ph.D. student at the University of Illinois at Chicago, and the lead author of a new paper in *Integrative and Comparative Biology*. "We not only confirmed the way that these birds make sounds with their feathers, but that the sounds are different for the two subspecies."

Like a mullet haircut, Fork-tailed Flycatchers are "business in the front, party in the back." They look like little black-and-gray swallows—except for their foot-long, scissor-shaped tails. They use those giant tail feathers to help attract mates, and they also spread them while they're zipping through the air hunting insects. But it's the flight feathers in the male birds' wings that they use to make sounds.

"They produce the sounds when they fly very fast, and they fly very fast when they're fighting each other. These birds fight a lot," says Gómez-Bahamón. "They're very feisty, they're not afraid of anything." The one-ounce birds are territorial and fight off bigger birds that come near their nests, even hawks more than ten times their size. And during mating season, the males fight each other.

Fork-tailed Flycatcher in the field. Credit: (c) Alex Jahn

During these fights, the birds produce a high-pitched trilling sound. Gómez-Bahamón and her colleagues wanted to confirm that these sounds were the fluttering of feathers, not vocalizations, and wanted to find patterns in the sounds produced. The researchers trapped live birds with mist nets—fine webbing stretched between two poles like a volleyball net. After recording measurements, the researchers let them go and recorded audio and video of the birds as they flew away. The Flycatchers' speedy retreats approximated their flight when fighting. And to get even closer to what a fighting Flycatcher looks and sounds

like, the researchers set up a taxidermy hawk in a field with a hidden camera. When the Flycatchers swooped in to attack the hawk, the camera recorded how their feathers moved and what sounds they made.

The video and audio footage, along with corroborating footage of flycatcher feathers in a wind tunnel, revealed that the sound did indeed come from the flight feathers on the birds' wings. What's more, the researchers found that the birds' feather sounds matched up with their migration patterns.

There are at least two subspecies of Fork-tailed Flycatchers. There's one that spends the whole year in the northern part of South America, and there's another that breeds in the southern part of the continent but comes back north closer to the Equator in winter. In the winter, the two subspecies live side by side. But while they're officially recognized as members of the same species, a few of their wing feathers are different: the researchers learned that in the migratory subspecies, the males' feathers have skinnier tips.

The different feather shapes produce different sounds when fluttered. The migratory subspecies makes a higher-pitched sound with its feathers than the stationary subspecies. Gómez-Bahamón conjectures that the migratory birds' feathers make it easier for them to fly long distances; they evolved feathers specialized for migration, and as a side effect, these feathers made a different sound than those of their homebody cousins.

The distinct sounds made by the migratory and stationary birds, which Gómez-Bahamón likens to different dialects or accents, could help further drive the two subspecies to evolve into fully separate species that can't interbreed with each other. Since the birds use their wing fluttering to communicate with each other, a language barrier could make for unsuitable mates.

"The other moment in which the Flycatchers produce this sound, aside from fighting, is in early morning, when it's still dark, they display to the female," says Gómez-Bahamón. "They sing their song and then they are quiet for a moment and they do this little flight that we cannot see because it's still dark, but you can hear the feathers. So in that case, because we can't record them, we don't know how fast they're flying. But we know that it's a display in which they are not escaping predators or they are not fighting each other. It's something that is intended for the females."

Gómez-Bahamón says that she's excited to see how these birds' feather fluttering helps show how new species arise, a process called speciation. "Communication is very important for speciation. It's what determines who you're going to mate with. They get all this information from the birds of the same subspecies, and they use that information to make this choice. That's the most important thing for animals, choosing a mate and having offspring. So I'm really proud of this study, because I like seeing how different ecological strategies, like migration, can indirectly affect communication signals. I think that's super cool."

More information: Valentina Gómez-Bahamón et al. Sonations in Migratory and Non-migratory Fork-tailed Flycatchers (Tyrannus savana), *Integrative and Comparative Biology* (2020). DOI: 10.1093/icb/icaa115

Provided by Field Museum