

Birds that live with varying weather sing more versatile songs: study

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A new study of North American songbirds reveals that birds that live with fluctuating weather are more flexible singers.

Mixing it up helps birds ensure that their songs are heard no matter what the habitat, say researchers at Australian National University and the National [Evolutionary Synthesis](#) Center.

To test the idea, the researchers analyzed song recordings from more than 400 [male birds](#) spanning 44 species of North American songbirds — a data set that included orioles, blackbirds, warblers, sparrows, cardinals, finches, chickadees and thrushes.

They used computer software to convert each sound recording — a medley of whistles, warbles, cheeps, chirps, trills and twitters — into a spectrogram, or sound graph. Like a musical score, the complex pattern of lines and streaks in a spectrogram enable scientists to see and visually analyze each snippet of sound.

For each bird in their data set, they measured song characteristics such as length, highest and lowest notes, number of notes, and the spacing between them.

When they combined this data with temperature and precipitation records and other information such as habitat and latitude, they found a surprising pattern — males that experience more dramatic seasonal swings between wet and dry sing more variable songs.

"They may sing certain notes really low, or really high, or they may adjust the loudness or tempo," said co-author Clinton Francis of the National Evolutionary Synthesis Center.

The Pyrrhuloxia or desert cardinal from the American southwest and northern Mexico and Lawrence's goldfinch from California are two examples.

In addition to variation in [weather](#) across the seasons, the researchers also looked at geographic variation and found a similar pattern. Namely, species that experience more extreme differences in precipitation from one location to the next across their range sing more complex tunes. House finches and plumbeous vireos are two examples, Francis said.

Why might this be?

"Precipitation is closely related to how densely vegetated the habitat is," said co-author Iliana Medina of Australian National University. Changing vegetation means changing acoustic conditions.

"Sound transmits differently through different vegetation types," Francis explained. "Often when birds arrive at their breeding grounds in the spring, for example, there are hardly any leaves on the trees. Over the course of just a couple of weeks, the sound transmission changes drastically as the leaves come in."

"Birds that have more flexibility in their songs may be better able to cope with the different acoustic environments they experience throughout the year," Medina added.

A separate team reported similar links between environment and birdsong in mockingbirds in 2009, but this is the first study to show that the pattern holds up across dozens of species.

Interestingly, Francis and Medina found that species with striking color differences between males and females also sing more variable songs, which means that environmental variation isn't the only factor, the researchers say.

More information: Medina, I. and C. Francis (2012). "Environmental variability and acoustic signals: a multilevel approach in songbirds." *Biology Letters*. [dx.doi.org/10.1098/rsbl.2012.0522](https://doi.org/10.1098/rsbl.2012.0522)

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