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When Its Environment Changes, So Does a Sparrow's Tune

By Elsa Youngsteadt
ScienceNOW Daily News
15 May 2009

The year was 1970. Simon and Garfunkel topped the charts, floppy disks were brand-new, and California white-crowned sparrows (*Zonotrichia leucophrys*) sang fast machine-gun trills. Just a few decades later, the sparrows sing noticeably slower songs, and a new study reveals the reason. The birds' habitat has gotten scrubbier, and their melodies have evolved to better penetrate the thickets.

Ecologists have argued for decades that habitat influences the evolution of bird song. Slow songs and low-pitched sounds transmit better through dense vegetation, whereas high notes carry farther in open environments. And overall, grassland birds do have faster, shriller songs than those from leafy surroundings have. But researchers discovered this by comparing modern populations or species from different habitats. They didn't know how long it would take a species' song to adapt to a new environment.

Now they do, thanks to a collection of historical recordings of white-crowned sparrows. Evolutionary ecologist Elizabeth Derryberry, now of Louisiana State University Museum of Natural Science in Baton Rouge, knew that, beginning in the late 1960s, renowned ornithologist Luis Baptista had spent decades studying the birds' chatter, buzzy songs. But she couldn't find his tapes. Finally, in 2003, 3 years after Baptista's death, Derryberry tracked down the sparrow songs in the professor's old office at the California Academy of Sciences in San Francisco. Among the boxes and reprints, she uncovered the songs of 170 male sparrows from 15 locations on the West Coast.

Thirty-five years after Baptista's visits, Derryberry embarked on a monthlong road trip to the same sites. She found that today's white-crowned sparrows sing the same basic song as their ancestors did, but the trill at the end is lower pitched and noticeably [slower](#)--on average only 10.3 trills per second instead of the [historical](#) 11.8. That difference was big enough for the sparrows to notice: The birds reacted more strongly to recordings of modern songs than they did to old ones, with males moving toward the sound and females doing a little dance. Derryberry wondered if a more densely vegetated habitat might be responsible for the decelerating trill.

Finding out meant tracking down another set of historical data: aerial photographs of the birds' habitats. Derryberry reports in the July issue of *The American Naturalist* that she found historic and modern photos for five of the 15 recording sites, and they showed that the birds' habitat had gone from being mostly grassy, with about 11% scrub, to 26% scrub. The slower modern songs would better penetrate the new scrubby habitat, which Derryberry attributes to reduced

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Deep throat. Male white-crowned sparrows are singing lower, slower songs as their habitat becomes leafier.

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livestock grazing.

That bird song can adapt so rapidly to habitat change is "an extremely exciting finding," says Manuel Leal, an ecologist at Duke University in Durham, North Carolina. Ecologist Matthew Betts of Oregon State University in Corvallis adds that "it's something people have expected should happen, but the data really haven't been there" until now.

Whether the changes in the sparrows' songs were cultural or genetic is still an open question. Betts also wonders whether other bird species would adjust their songs as quickly. These questions may not be out of reach. It took Derryberry 6 years to assemble her epic historical data set, but many more people are recording bird song now than 30 years ago, Betts says. He expects to see a bloom of similar studies.

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<p>very interesting research to put in connection with the research about birds in the big and noisy cities, where the bird's song is so loud to overcome the noisy environment that it could reach 100 decibels.</p> <p>More Like this comment? [yes] [no] (Score: 2 by 2 votes)</p>	<p>saraswati27 Sunday, May 17, 2009</p> <p>[reply]</p>
<p>I found this article to be very exciting. I hope that more people will study this issue. I hope that I will read more about this issue soon.</p> <p>More Like this comment? [yes] [no] (Score: 1 by 1 vote)</p>	<p>Guest Sunday, May 17, 2009</p> <p>[reply]</p>
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<p>It's heartening to know that bird are able to adapt to quick habitat change. It also shows how valuable data thought to be old and out-of-date can be.</p> <p>More Like this comment? [yes] [no] (Score: 1 by 1 vote)</p>	<p>Dorothy T. Sunday, May 17, 2009</p> <p>[reply]</p>
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<p>Intriguing article, but leaves me with questions about how the conclusions were drawn together. Did the research consider bird movements from one area to another? How do we know this is the same family of sparrows? Did they really adapt... or just move to another similar habitat? Perhaps birds with slower trills lived in a different region 40 years ago and simply moved to this location for a completely unrelated reason (like food, for example). Are the fast-trilling birds still heard in other regions with a grassy habitat similar to the 60's habitat? If not, why not? Are all sparrows slow-trilling now, or just these particular ones? It seems difficult to make a case for the theory that the birds adapted in a "short" timespan if these questions cannot be adequately addressed. Maybe they were and just not covered here.</p> <p>More Like this comment? [yes] [no] (Score: 1 by 3 votes)</p>	<p>jz Tuesday, May 19, 2009</p> <p>[reply]</p>
<p>Post hoc ergo propter hoc. What else changed besides scrub density in the past 35 years? All traits fluctuate over time -- I'd be more surprised if you told me birds used 11.8 trills 35 years ago and still use 11.8 trills today.</p> <p>More Like this comment? [yes] [no] (Score: 1 by 1 vote)</p>	<p>timbr Friday, May 22, 2009</p> <p>[reply]</p>

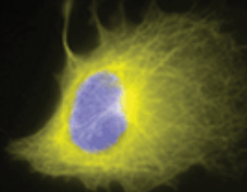
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