How migratory birds respond to balmier autumns?

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Around the world, no matter where we are, we can usually expect the weather to change from one season to the next. In North America, the warm days of summer eventually turn into the cooler days of autumn, and these changes are vital to a lot of the animals that inhabit the region as they trigger the urge of animals to prepare for winter. Migratory animals, like songbirds, use these predictable weather changes as environmental cues to tell them when it's time to migrate south. But with the earth now getting hotter and hotter each year, birds can no longer rely on the once predictable climate. As autumns are becoming milder, ornithologists keep pondering on how it could be affecting birds' migratory decisions. Now, a new paper published this week in an online

journal *Animal Migration*, has experimentally investigated how birds use temperature as a signal to migrate.

The study led by Adrienne Berchtold from the Advanced Facility for Avian Research at the University of Western Ontario, focused on one songbird species that is known to rely on weather for its migratory journey: the white-throated sparrow. The bird migrates from Canada to the southern United States each autumn, and it tends to migrate later than other migrants, basing its journeys on when the weather provides opportunities for flight.

To figure out the underlying pressures that drive the birds to migrate, the researchers captured white-throated sparrows during one autumn migration and placed them in specially-designed bird cages equipped with high-tech monitoring gear that kept track of how active the birds were by day and night. The scientists then changed the room temperatures throughout the experiment to see how the birds would react. When the temperature dropped to chilly 4ºC, in an attempt to mimic the typical fall conditions in the northern part of the flyway, the birds all became restless at night, signifying they were in a migratory state. When, in turn, the temperature was raised to a warm 24ºC, none of the birds showed signs of migratory restlessness, indicating they were under no pressure to depart in these balmy conditions.

These results will have considerable implications for the future of the migration as this and other bird species rely on predictable weather changes to leave home for the season. In North America, the continuous trend in soaring autumn temperatures could delay the birds migration. Yet another more drastic possibility is that the birds would decide, perhaps unsurprisingly, to stay put and not to migrate at all. In fact, a recent paper in this same journal found this very pattern is happening in the population of American Robins of North America, who are increasingly deciding not to migrate.

According to Andrew Farnsworth, a Research Associate at the Cornell Lab of Ornithology who studies bird migration, "This type of research gives us more of the clues that scientists need to understand how birds respond, and might respond in the future, to changes in environmental conditions they experience. Considering these findings in light of previous research on nocturnal migratory restlessness from the mid to late 20th century, and more importantly, recent research on fuel accumulation and photoperiodicity, these results add to our growing understanding of how birds migrate and even how their migration evolved. Furthermore, given the predicted changes in global temperatures from human activities, these findings highlight the potential for dramatic changes to movements for many migratory species ."

More information: Adrienne Berchtold et al, Experimental temperature manipulations alter songbird autumnal nocturnal migratory restlessness, *Animal Migration* (2017). DOI: 10.1515/ami-2017-0001

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