

The Outside Story



Bird Smell is Nothing to Sniff At By: Carolyn Lorié

I have spent about a decade as a backyard birder and have learned quite a bit in that time. I can instantly recognize the call of a red-winged blackbird and the sweet summer song of the wood thrush. I know a scarlet tanager the moment I see one and can distinguish between the various hawks that inhabit this area. I am knowledgeable about migration patterns, nesting habits, mating and fledging.

But avian olfaction? Not so much.

I always assumed that birds did not have a sense of smell or that it was so minimal as to be insignificant. I am not alone in this assumption. "Conventional wisdom is that most birds don't use a sense of smell," explained Todd Katzner, a research and wildlife biologist with the US Geological Survey. "For years in ornithology classes, we were told that birds did not smell. Except for turkey vultures and some seabirds."

But for many years, even those birds were thought to lack the ability to smell. Or at least that was the belief since the 1820s, after John James Audubon set out to prove that turkey vultures (*Cathartes aura*) relied solely on sight to scavenge. He did this by placing a canvas with a painting of a cut-open, skinless sheep, out in an open area. The birds descended on the painting and tore it apart as if it were carrion, thereby showing, he claimed, that they weren't relying on scent at all.

This was not his finest moment as a naturalist. For starters, there have been scholarly questions about whether the birds he observed were in fact black vultures. In any event, later, more rigorous studies showed that vultures do indeed have a keen sense of smell and that the birds in Audubon's experiment most likely were attracted to the painting because of it. Oil-based paints emit sulfides very similar to those emitted by decaying flesh. Those studies, however, did not take place until the 1960s and by then the idea that birds cannot smell had become part of the "conventional wisdom."

One of the people challenging that wisdom is Gabrielle Nevitt, an olfactory neuroscientist at the University of California, Davis. "I had no idea that birds were not supposed to have a sense of smell," she said. "My mother loved birds, and we had all sorts of species living with us who routinely demonstrated that they could smell. For example, I can remember my pet rooster making the come-and-get-it call when cookie smells wafted through the house."

Like all vertebrates, birds have an olfactory bulb in their brains, though the relative size of the bulb varies greatly across species. In songbirds the bulb is relatively tiny, while just the opposite is true in seabirds. For example, the snow petrel (*Pagodroma nivea*), an arctic

seabird, has an olfactory bulb that occupies more than 35 percent of its cerebral hemisphere.

Nevitt has spent years studying procellariiformes, an order of seabirds that includes albatrosses, petrels and shearwaters, all of which spend most of their lives at sea, and consume krill, fish and squid. Her research has demonstrated that these birds use their sense of smell to forage areas of open water. They do so not by sniffing out their prey directly, but by detecting a chemical byproduct created when those animals feed on phytoplankton. This by-product, dimethyl sulfide (DMS), is emitted into the air, creating what Nevitt calls an “olfactory landscape.”

While the research on seabirds is fascinating, as a landlocked Vermonter, what I want to know is whether any of this is relevant to the birds I see on a daily basis – the juncos and titmice and blue jays?

The answer is yes.

“This area of study is rapidly growing, and so far, every songbird studied has demonstrated olfactory capabilities,” explained Danielle Whittaker, an evolutionary biologist at Michigan State University. “I’m aware of studies on zebra finches, song sparrows, white-throated sparrows, starlings, house finches, catbirds, blue tits and house sparrows. In fact, I would be very surprised if any bird species didn’t have this ability.”

One such study that Whittaker worked on involved dark-eyed juncos (*Junco hyemalis*). She put material in the nest of juncos that contained the preen oil of other juncos as well as birds from other species. The juncos reacted by spending less time on their nests than is typical. In one instance, a female junco became

what Whittaker described as “visibly upset” when she detected the foreign smell and began pulling material out of the nest and disposing of it. (A video of Whittaker describing the experiment can be seen here: <http://www.pbs.org/wgbh/nova/blogs/secretlife/sports/danielle-whittaker/>.)

Not all studies have been as conclusive and it is possible, said Nevitt, that some birds may prove to have reduced sensitivity to smell based on their anatomy. On the other hand, some birds may have far greater capacity than is currently understood. “It is quite likely that many other species of birds use olfaction for foraging and navigation or in social contexts, but the area of research is still under-studied,” she explained.

Carolyn Lorie lives in Post Mills with her partner, Rick, and their three dogs, two of whom are well behaved. The illustration for this column was drawn by Adelaide Tyrol. The Outside Story is assigned and edited by Northern Woodlands magazine, www.northernwoodlands.org, and sponsored by the Wellborn Ecology Fund of New Hampshire Charitable Foundation: wellborn@nhcf.org.

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