NEWS

Why Birds Are Anti-Aging Superstars

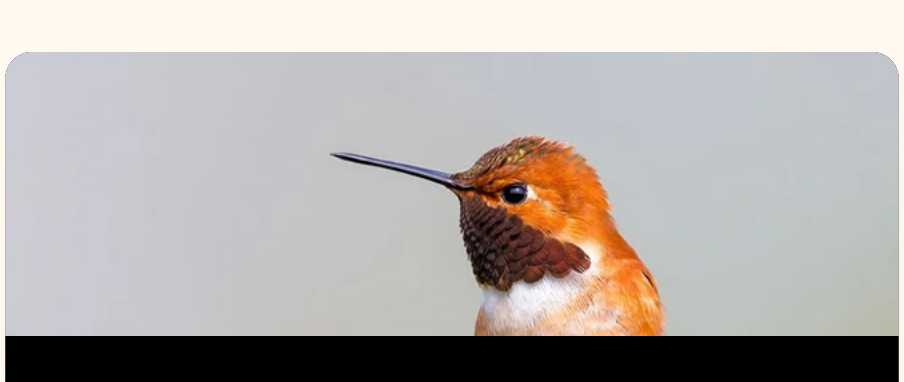
Despite their extreme lifestyles, avians can live remarkably long lives for animals their size.

Wisdom the Laysan Albatross on her nest on Midway Atoll in 2020. Photo: Jon Brack/Friends of Midway Atoll NWR

Words by Margo Rosenbaum
Reporter, Audubon magazine

Published November 10, 2022

Wisdom the Laysan Albatross celebrated a big birthday last year, turning a whopping 70 years old. Flying for months at a time over the open sea, albatrosses' bodies are built to last, and as far as we know, she is the oldest wild bird in the world. However, the reason for Wisdom's extraordinarily long life—even living longer than the biologist who first banded her—remains a mystery.



BIRDS TELL US TO ACT ON CLIMATE

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While most birds don't reach their eighth decade like Wisdom, they have earned a reputation for longevity that has puzzled scientists for centuries. In 1623, English philosopher and scientist Francis Bacon observed that birds outlive small mammals. Now we know that birds, on average, live two-to-three times longer than mammals of the same size. Steven Austad, who studies the biology of aging at the University of Alabama at Birmingham, likes to compare mice that rarely survive more than a year outside of a lab with wild House Sparrows that can, at the highest end, live until 20.

Life expectancy in most animals, including birds, usually relates to size—the larger the bird, the longer it lives—which explains why tiny Ruby-throated Hummingbirds typically live three to five years and Bald Eagles can reach their 30s. But there are exceptions: Shorebirds, gulls, and tubenoses—such as albatrosses, shearwaters, and petrels—live well past what is expected of their size. House cat-size Manx Shearwaters regularly hit their 50s and earn the prize of longest-lived bird for their body size.

The best theories to explain birds' longevity point to the power of flight as the major driver of avian biology. Annual migrations, sometimes for thousands of miles, require biological tricks for remembering geographic locations, maintaining strong muscles, and keeping their eyes and ears working well. Flight also allows birds to more easily evade predators and find shelter. "They've had to be so highly engineered to succeed at flight," Austad says. "That kind of physiological integrity has allowed them to stay healthy much longer than another animal."

Further evidence for this theory comes from the fact that strong flying birds, like the albatrosses, shearwaters, and petrels, tend to live longer than weak flyers, such as turkeys. And like birds, bats survive longer than expected for their size.

Even as they age, most bird species lack physical signs of getting old—their beaks don't wrinkle, and their feathers don't thin out or go gray. "Usually, you can't tell the bird is old just by looking at it," says Kenn Kaufman, field editor for *Audubon* magazine. "In a few birds, they'll start to develop more white feathers in the plumage around the head, like a person's hair turning white, but that's not a common thing." Unless a bird is banded, it's hard to know its age.

However, birds still go through the aging process. "The dogma in the field for many years was they don't really age, they just die," Austad says. "But everybody that has studied them intensively can see some signs of them aging." As with humans and other animals, aging causes bodies to deteriorate over time, making animals increasingly defenseless and prone to disease.

Reproductive aging—the process of decreased fertility—is one of the best measures for aging in wild birds, says Donna Holmes, who teaches reproductive biology and development at the University of Idaho. Many bird species start experiencing declines in clutch size, changes in hormones, and altered parental care behavior by mid-life. But the rate depends on the species, which explains why birds like Wisdom are still alive and reproducing. Some long-lived seabirds even increase their reproductive success with age. "That's not something we see very often in mammals at all," Holmes says.

As they get on into their senior years, birds also stand out among other animals by continuing to live to the extremes, including on long migrations. "They have really high metabolic rates, and their blood glucose is through the roof," Holmes says. "They need that to fly." Cold-blooded amphibians and reptiles reach old age by slowing down their heart and breathing rates. "A tortoise that lives 150 years hasn't had its heart beat as many times as a hummingbird that lives 12 years," Austad says.

Past studies show that avian longevity may be linked to special adaptations in the biology of birds—including proteins to operate their highly efficient metabolisms and their remarkable ways of processing oxygen—that prevent tissue damage commonly associated with old age. In many animals, high body temperature, metabolic rates, and blood glucose levels indicate a shorter lifespan because these systems damage DNA in the mitochondria, the structures that power cells. But compared to other animals, birds are very good at protecting their mitochondrial DNA from the cellular damage associated with aging, which could contribute to their extensive lifespans, according to one study.

For years, Austad and Holmes have been proponents of aging research with birds. Austad believes studying birds could enhance our understanding of aging in humans, too, leading to advances in human health. "We want to know how nature has constructed things that resist aging better than we do," he says. "Otherwise, we're left to our own ingenuity."

While birds may be longevity powerhouses, their time eventually runs out. But it's tricky to understand what dying of old age means when birds aren't, for example, hooked up to hospital machines. Complications like cancer and cardiovascular disease are rare, and if they do kill wild birds, "we don't know about it," Austad says. Instead, it's more common for them to perish from predation, harsh weather, or habitat conditions. Birds in captivity get cataracts, and it's possible that wild birds do, too, making them more susceptible to slamming into windows or becoming meals for outdoor cats. But beyond the obvious signs, "we really are relatively ignorant about what kills birds in nature," Austad says.

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Krysta Rogers, a senior environmental scientist at the California Department of Fish and Wildlife, makes her living answering this question. She often concludes that birds have succumbed to disease, starvation, poisons, predation, electrocution, or collisions, but not old age. Few of the birds she receives are banded, so she usually doesn't know their ages.

Once a bird dies, its body doesn't persist for long. After scavengers have their fill, it quickly decomposes into the environment. The birds Rogers investigates must be recovered quickly—up to 24 hours after they perish is best—so her reports aren't representative of all bird deaths in California. "If you have a bird that just slowly winds down and dies, it's very possible it's not going to be recovered," she says.

When a bird's time comes, usually there's nobody around to watch. In Austad's own research on birds in Venezuela, he never learned what happened to birds that stopped coming to his field site. "Did something get it? Did it die?" he used to wonder. "Or did it just make a long-distance jump to another area?" Unless birds are tagged with GPS trackers, we may never know where they meet their end.

One day, that may be the fate of Wisdom, the long-lived albatross. But hopefully not this year. She's due back to her nesting grounds this winter.

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Great Egret. Photo: Melissa Groo/Audubon Photography Awards