

Why birds wear bright feathers.

By McGraw, Kevin

Have you seen any colorful birds lately? Common backyard visitors such as cardinals, blue jays, and orioles make a parade of color. For years, scientists have wondered why little creatures, like songbirds, are so brightly colored, especially when their colors might make them more obvious to their predators.

Usually, the colorful birds we see are the males. For instance, in the familiar house finch, males are bright red, but females are brown. It turns out that female birds are attracted to the bright colors and prefer to mate with the most colorful male house finch they can find.

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But why do females choose the brightest male? What does a male's color tell a female about him?

In many species, male and female birds work together to raise the young. Each female wants to choose the best male to help her. Might the colors of a male bird's feathers tell something about whether he'll be a good father?

Yellower Is Better

We are scientists who study how animals communicate with one another. We reasoned that a healthier male would make a better father. So we wanted to see if the feather colors of male birds say something about their health.

We studied the American goldfinch, a species in which females form pairs with the brightest-colored males. The neat thing about these birds is that the males display two different types of color in their feathers. Most of the body of a male goldfinch is covered in lemon-yellow feathers. These feathers have this color because they contain yellow carotenoid (kah-RAW-tin-oid) pigments, which also make carrots orange and autumn leaves colorful.

A Black Cap

The male goldfinch also has a nice round cap of black feathers on his head. These feathers are full of melanin (MEL-uh-nin) pigments, like the ones that color our hair and skin. Unlike males, females grow only a small patch of yellow feathers on their bodies and do not have black caps.

The difference between carotenoid pigments and melanin pigments is that animals can't make their own carotenoids. Birds can make their own melanin pigments. But to grow red, orange, or yellow feathers, birds must eat fruits, berries, and seeds that have carotenoid pigments.

So, do these two types of color--carotenoid and melanin--tell how healthy a male goldfinch is?

To find out, we studied a stomach parasite that can make these birds sick as they are growing their colorful feathers. Growing new feathers requires a lot of energy, so males that are sick with parasites may not be able to put as many colorful pigments into their growing feathers.

To run our experiment, we kept two groups of birds in cages when they were growing their bright feathers. In one group, we treated the birds with medicine to get rid of their parasites so that the birds could be healthy. In the other group, we did not protect the birds from parasites.

When the finches had finished growing their feathers, we compared the colors of the two groups of males. We found that the males in the parasite-free group had grown brighter-yellow feathers than the males that weren't as healthy. So, by choosing the yellowest males, females get the healthiest mates.

Is Blacker Better?

When we looked at the black feather patches, we discovered something very different. The healthiest males didn't grow the largest or blackest caps. The black feathers didn't tell anything about how sick the parasites made the birds.

What are the black feathers for, then? Well, in many birds, these melanin patches are related to how aggressive males are and how willing they are to compete for territories or mates. The bigger the black patch, the better fighters they are. So it seems that the black (melanin) feathers may say something entirely different from the carotenoid feathers. In fact, the black cap may tell other males: "Stay out of my territory!"

Now that scientists know that birds can send different messages to one another with different types of color, what's next? Birds have a third type of color--"structural" color--which makes feathers blue or iridescent. Naturally, now we wonder: "What messages do structural colors send?"

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