

Sexual selection makes female songbirds drab

Study of 6,000 bird species shows why females sometimes evolve colourful feathers, but mostly don't.

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The eye-catching plumage of some male songbirds has long been explained as a result of sexual selection: brighter males compete more successfully for mates, so evolution favours their spread. Females, by contrast, remain drab.

A new study turns this explanation on its head. Sexual-selection pressures drive females to evolve dull feathers more strongly than they drive males to become colourful, argues James Dale, an evolutionary ecologist at Massey University in Auckland, New Zealand.

That surprising conclusion is based on a data set of plumage colour in nearly 6,000 songbirds, which Dale and his colleagues built. They used their data to ask how various potential evolutionary factors drive male and female plumage colour. If a particular songbird species was polygynous (that is, the males had more than one mate), displayed a large difference in size between males and females, and left care of the young mainly up to the females, then the researchers judged that sexual selection was likely to be an important factor in that species' evolution.

The study, published in *Nature*¹, found that sexual selection does play an important role in creating colour differences between male and female plumage. But the contrast is largely driven by females evolving to become drab. "Females are the chief architect of the difference," says Dale.

Subdued palette

Researchers don't know for sure why it appears so important for females to be drab when sexual selection acts on a species, Dale says. In monogamous species, however, females are more likely to be brightly coloured, perhaps because they need showy displays to compete for resources (including male mates), or because it may assist their social interactions with other females.

In polygynous species, by contrast, males may be less choosy about their mates, Dale suggests, so that there is little benefit to females displaying a colourful plumage that is energetically costly for them to maintain.

Geoff Hill, who studies the evolution and molecular basis of bird coloration at Auburn University in Alabama, agrees that sexual selection acts on both male and female coloration. But he says he is "hesitant" to support the finding that sexual selection acts more strongly on female than on male colour. Hill queries the analysis because it does not use direct measures of sexual selection, such as data on whether female songbirds in a particular species tend to choose more-brightly coloured males. Instead, it relies only on proxies that indicate that sexual selection may be important for a species. But Dale counters that the proxies used are "relatively standard" for these kinds of studies, while data on mate choice in many species do not exist.



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Tropical colour

The study suggests that bigger songbird species tend to be more colourful — backing up an idea that because predators are less likely to attack larger individuals, bigger species don't need to lose their colour to avoid predators. And in songbirds with a history of breeding in the tropics, both sexes tended to be brightly coloured, the study found.

This mainly illustrates that there are many evolutionary drivers of variation in bird plumage colours, not just sexual selection, Dale says. Sexual selection does not explain why many females are also colourful, or why both sexes of many monogamous bird species are brightly colored, for example. “There is a lot of variation and it got swept under the rug,” he says.



Video: Fish leaps to catch birds on the wing

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References

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1. Dale, J., Dey, C. J., Delhey, K., Kempenaers, B. & Valcu, M. *Nature* <http://dx.doi.org/10.1038/nature15509> (2015).