Looks matter to female barn swallows

Even after they have paired with a male, the female North American barn swallow still comparison-shops for sexual partners. And forget personality; the females judge males by their looks -- the reddish color of the males' breast and belly feathers.

If the male's red breast is not as dark as other males in the population, the female is more likely to leave him and then secretly copulate with another male, according to a Cornell University study featured on the cover of the journal Science (Sept. 30, 2005).

"The bad news for male swallows is the mating game is never over," said lead author Rebecca Safran, who conducted the study while a Cornell postdoctoral researcher in ecology and evolutionary biology, and in the Cornell Laboratory of Ornithology. "It is dynamic and continual. This is something that most humans can relate to -- think of how much time and money we spend on our looks and status long after we have established stable relationships."

Barn swallow (*Hirundo rustica erythrogaster*) males have a wash of reddish-chestnut color from their throats to their bellies, and this color varies among birds from very pale red-brown to a dark rusty-red. Like many songbirds, half of all male barn swallows typically care for at least one young chick that was actually fathered by another bird. The researchers used this widespread phenomenon of cheating to test the factors that may keep a female barn swallow faithful to her mate. Sometimes males even rear an entire nest of illegitimate young.

After all pairs had laid their first set of eggs, Safran removed the eggs so that the females would mate again. Before the females chose their mates for their second nest, Safran captured the males and randomly assigned them to one of three treatments. She either painted their throats, breast and belly feathers with a red marker to enhance their feathers to match the darkest -- and most attractive -- males in the population, or left them alone or painted them with a clear marker to ensure that results were not biased by the coloring process. Then she let the pairs breed again. She conducted comparative DNA tests on the offspring from the first and second nests.

In the research, all 30 females remained socially paired with their original male mate, but they were sexually active with other males. The males with enhanced color fathered a substantially larger percentage of offspring in their second nests. Males whose color was unchanged fathered the same number or fewer chicks than they had in their first nests. "The study shows that the females are paying close attention to these signals and that they respond quickly to changes in their mate's appearance," said Safran.

The reddish breast and belly feathers indicate a male's quality, such as his health, status or ability to raise young, Safran speculates.

The actual cue that female barn swallows use to assess potential mates differ according to regional tastes. For example, classic studies have shown that in the very closely related European barn swallow (*H. rustica rustica)* , males with long tail feathers attract more mates. Although many previous studies have investigated mating patterns in birds and other animals, this is the first study of its kind to meticulously rule out biases such as age, size and initial variation in signals of male quality, like coloration, and to demonstrate that mate-selection decisions are continual and dynamic. The results of the study have implications for the evolution and upkeep of showy ornamental traits -- such as a peacock's tail or a deer's antlers -- that are costly for males to maintain but give them an edge over rival males. "If females are assessing mates on a day-to-day basis, it explains why males continue to maintain costly ornaments even when they might appear to have served their purpose," said co-author Irby Lovette, assistant professor and director of the Cornell Lab of Ornithology's Evolutionary Biology program.

"Our goal is now to understand how certain males keep a better plumage than others," said Kevin McGraw, Cornell Ph.D. '03, one of the co-authors who is now an assistant professor at Arizona State University in Tempe. "Factors like ultraviolet radiation from the sun, soiling and even feather degrading bacteria are known to affect the color of bird feathers once they are grown, and perhaps the best males are those who spend more time preening and protecting their plumage."

The paper's other co-author is Colby Neuman, Cornell B.S. '05. In early September, Safran began a new position as a postdoctoral researcher at Princeton University. Supporters of the study included: the National Science Foundation, the American Association of University Women, the American Ornithologists' Union and the Animal Behavior Society.

Source : Cornell University News Service

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