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Color me sexy: Looks play factor in bird mating game

If the activity of the North American barn swallow is a clue, then those that are in the market for love need to maintain their appearances.

New research shows that the female North American barn swallow, even after pairing with a male, still comparison shops for sexual partners. Forget about personality; females judge males by their looks, especially the chestnut color of the males' breast and belly feathers, according to a team of researchers that includes a professor from ASU.

In a study featured on the Sept. 30 cover of the journal *Science*, the researchers explain that if the males' brown breast is not as dark as other males in the population, the female is more likely to leave him and copulate with another male. The article, "Dynamic Paternity Allocation as a Function of Male Plumage Color in Barn Swallows," has evolutionary implications and shows how ornamental traits – such as the deep color of a male barn swallow or the antlers of a deer – are costly to males but provide an edge over rival suitors.

"Female barn swallows were more likely to be faithful to their partners when we experimentally altered their mates' appearance to make their feathers more colorful," says Kevin McGraw, co-author of the study and an assistant professor in the School of Life Sciences at ASU. "This is the first time a study has ever demonstrated that female birds can make rapid decisions – based on changing qualities of their mate – about whether or not they should cheat on him."

"The bad news for male swallows is that the mating game is never over," adds Rebecca Safran, who led the research team as a post-doctoral student at Cornell University in Ithaca, N.Y. "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."

In addition to McGraw and Safran (now at Princeton University), other team members are Irby Lovette and Colby Neuman, both of the Cornell Laboratory of Ornithology.

"Our results show that, even after he's secured a mate, a male barn swallow still must maintain an attractive appearance – akin to staying clean shaven, or keeping his 'suit' clean – to please his partner and continue to mate with her," McGraw says.

Like many songbirds, half of all male barn swallows (*Hirundo rustica erythrogaster*) typically care for at least one young chick that was fathered by another bird. The ASU-Cornell researchers used this widespread phenomenon of cheating to test factors that might keep a female faithful to



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her mate.

Male barn swallows have a wash of reddish-brown color from their throats to their bellies. This color varies among birds from pale to deep chestnut. Previous studies by Safran demonstrated that male color may indicate a male's quality – health, status or ability to raise young – indicating that the color signal may be involved in mate selection decisions.

To assess mate selection decisions, the researchers removed the first set of eggs laid by 30 pairs of barn swallows so that females would be forced to mate again. Before females chose their mates for a second nest, the researchers captured the males and randomly assigned them one of three treatments.

They either painted the birds' throat, breast or belly feathers with a brown marker to enhance their feathers to match the darkest (most attractive) males in the population; they left them alone; or painted them with a clear marker to ensure the coloring process did not bias results. Then they let the pairs breed again and conducted comparative DNA tests on the offspring from the first and second breeding bouts.

All 30 females remained socially paired with their original mate, but they were sexually active with other males. Males with enhanced color fathered a substantially larger percentage of offspring in their second nests compared to their first nests. Males whose color was unchanged fathered the same number or fewer chicks than they had in their first nests.

"Our goal now is to understand how certain males keep better plumage than others," says McGraw, who studies the molecules that color a bird's plumage and the evolutionary importance of color for birds. "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. Perhaps the best males are those who spend more time preening and protecting their plumage."

Skip Derra, Skip.Derra@asu.edu
(480) 965-4823