

# Study: The bright red of cardinals means less in urban areas

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Normally, the brilliant red of a male cardinal signals to females that he is a high-quality mate. But that may not be true of cardinals living in urban areas, a new study suggests.

Researchers found that the bright red feather coloration of male [northern cardinals](#) (*Cardinalis cardinalis*) was less related to body condition for birds living in urban forests than it is for those in rural forests. In other words, even cardinals in relatively poor condition may appear bright red in urban areas.

"We found that the relationship between brightness and body condition was stronger in more rural landscapes than it was in urban areas," said Amanda Rodewald, co-author of the study and professor of wildlife ecology at Ohio State University's School of Environment and Natural Resources.

"That means urbanization has the potential to disrupt cues that birds have long used to assess quality and choose mates."

Rodewald conducted the study with Todd Jones, an undergraduate student researcher at the time, and Daniel Shustack, a recent doctoral graduate. Their results appear in the current issue of *The Wilson Journal of Ornithology*.

The researchers studied 129 male and 145 female cardinals that were captured in 13 forests in central Ohio between 2006 and 2008. Each

forest was rated as to the amount of urbanization surrounding it, and the researchers compared feather samples from cardinals at each site.

The feathers were photographed and the photos were analyzed by a software program that measured the hue, saturation and brightness of each feather.

They also measured body mass and size of the cardinals to indicate their body condition, or health. Body condition considers how much a bird weighs after adjusting for its frame size.

The researchers did not find any relation between female body condition and plumage brightness and whether they lived in a more urban or more rural area.

For males, brighter feathers were indicative of birds in better condition in rural areas, but were not as indicative in urban areas.

In cardinals, as in some other birds, feather coloration is related to their diet. Diets high in carotenoids - pigments found in some fruits and other parts of plants - lead to brighter feather colors.

Previous studies indicate that forests within urban areas have nearly three times the amount of fruit and nearby bird feeders than exist in rural areas. Urban forests have many exotic and invasive species, such as Amur honeysuckle and multiflora rose, that provide abundant sources of carotenoid-rich fruits.

The fact that carotenoid-rich fruits are more available in urban areas, to birds over a wide range of conditions, may be one reason that brighter [feathers](#) aren't more indicative of healthy birds in [urban areas](#), Rodewald said. In rural forests, only the highest-quality individuals may have access to carotenoids.

Rodewald is continuing this research by studying how plumage [coloration](#) is related to the quality of territories that [birds](#) secure and their ability to produce young.

**More information:** [www.wilsonsociety.org/pubs/index.html](http://www.wilsonsociety.org/pubs/index.html)

Provided by The Ohio State University

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