

Female lemurs with color vision provide advantages for their group

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A male mongoose lemur (*Eulemur mongoz*) Credit: Wikipedia.

Female lemurs with normal color vision, as well as their cohabitating colorblind group members, may have selective advantage over lemur groups whose members are all colorblind, according to anthropologists at The University of Texas at Austin.

Unlike other placental mammals, Old World monkeys, apes and humans are unique in displaying "normal" color vision—or trichromacy. However, New World monkeys, or primates indigenous to the Western Hemisphere, are primarily red/green colorblind—or dichromatic—with trichromatic color vision occurring in some females but no males. Several scientific theories exist on how color vision diversity among these species has maintained over the years, but new research on Verreaux's sifaka, a species of lemur native to Madagascar, challenges existing hypotheses for the evolution of color vision in both Old and New World monkeys.

In the study, appearing in *Scientific Reports*, UT Austin anthropologists documented trichromacy in a population of wild lemurs and its effects on fitness, such as reproductive success and feeding behavior. The study was conducted at UT Austin anthropology professor Rebecca Lewis's Ankoatsifaka Research Station at Kirindy Mitea National Park in western Madagascar, where she has accumulated a decade's worth of behavioral, health, demographic and habitat data on the sifaka.

"Previously, researchers trying to understand why trichromacy evolved have focused on color vision in New World monkeys," said Lewis. "However, studies of wild monkeys were unable to find clear benefits for trichromacy. Our work on lemurs suggests that being able to distinguish red from green can be particularly important when times are tough and that trichromatic females are better able to feed themselves and their babies."

Unlike previous research which focused on the advantages and disadvantages of color vision for the individual, UT Austin researchers examined how one individual with trichromatic [color vision](#) could provide an advantage for the entire group—a particularly novel study for the sifaka, whose females are dominant and more likely to lead their two- to 13- member groups when foraging, Lewis said.

The researchers found that trichromats, which made up less than a quarter of the 31 females tested, and their cohabitating dichromats showed higher body mass indices in the dry seasons, as well as a trend toward increased infant survival rate among trichromat mothers.

During the dry season, May to November, lemurs face difficulties finding enough food, with the average sifaka experiencing a 10 to 20 percent loss of body mass during this time. However, groups with trichromat females exhibited 5 percent higher body mass indices on average than groups with only colorblind lemurs.

Coinciding with the dry season is the sifaka's birthing season in July and August. Though evidence was limited due to the number of lemurs in the study, researchers believe lemurs with higher BMI are more likely to have successful pregnancies. Further evidence from the study supports the idea that infants of trichromatic mothers are 22 percent more likely to survive the first year.

"In long-lived animals like primates, it can be challenging to collect enough data to detect differences in fitness. The fact that we found this robust effect on BMI across multiple social groups suggests that there really is a selective advantage to being a trichromat and to living in a social group with trichromats," said the study's lead author and UT Austin postdoctoral researcher Carrie Veilleux.

The researchers observed evidence of a higher consumption of fruit among individuals living with trichromat females, likely due to the female's ability to spot the fruit and lead her group to it. This effect was most pronounced in the energetically-stressful [dry season](#) when trichromat [lemurs](#) and their group mates fed on fruit for longer periods of time than members of the colorblind groups, a finding that likely contributes to better body condition and an increased likelihood of infant survival, researchers said.

More information: Carrie C. Veilleux et al, Group benefit associated with polymorphic trichromacy in a Malagasy primate (*Propithecus verreauxi*), *Scientific Reports* (2016). [DOI: 10.1038/srep38418](https://doi.org/10.1038/srep38418)

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