

For female vampire bats, an equal chance to rule the roost

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The study suggests vampire bats live in communities that are “more fluid and open,” senior author Gerald Carter says. Credit: Rachel Moon

Female vampire bats establish an egalitarian community within a roost rather than a society based on a clear hierarchy of dominance that is often seen in animal groups, a new study suggests.

Researchers observed more than 1,000 competitions for food among a

colony of 33 adult [female bats](#) and juveniles living in captivity, assigning a rank to each bat based on a calculation of wins and losses in those contests.

The team found that, unlike in many mammal societies, the higher-ranking animal didn't necessarily win every bout over food, and there was a randomness to the ranking order—no specific quality they measured gave a bat a better chance at [dominance](#), so any adult female had an equal opportunity to rank very high or very low on a scale of dominance in the roost.

Traditionally, research on group-living animals—especially primates—in the wild has focused on how a dominance structure factors into survival, longevity and healthy offspring, and only later considered the importance of friendship in those same communities.

Senior study author Gerald Carter has worked in reverse order. His research on highly social female [vampire bats](#), whose behaviors resemble what's been observed in some primate groups, has focused on cooperation, finding that [vampire](#) bats make "friends" through a gradual buildup of trust and show signs of maintaining those friendships in the wild.

"We realized we don't know anything about dominance among female vampire bats, so this is a first step in the direction of trying to identify how similar they are to primates in this way," said Carter, assistant professor of evolution, ecology and organismal biology at The Ohio State University. "We can say quite clearly that they're definitely not like some of the well-studied primates. They don't have a very clear social rank that they're constantly enforcing."

The study is published today (July 7, 2021) in the journal *Royal Society Open Science*.

The research team video-recorded 1,023 competitive interactions concerning food over three months in a captive colony of common vampire bats at the Smithsonian Tropical Research Institute (STRI) in Panama. The colony consisted of 24 [adult females](#) captured from two distant sites as well as nine young bats—four males and five females.

Winners and losers were identified from five types of events at the blood-meal feeders: displacement of a feeding bat by an intruding bat with or without [physical contact](#); a feeding bat's maintenance of its position following an approach by another bat, with or without contact; and a nearby bat waiting to eat until after a feeding bat leaves the feeder.

Researchers assigned social rank to individual bats based on wins and losses and found widespread variability in adult female bat rankings, with essentially no predictors for how these community arrangements played out. No associations were found between body size, age and reproductive status and dominance ranking, and common vampire bat behaviors of grooming and sharing food were not associated with social rank. Being related to each other had no effect. The only possible predictor detected, when male juveniles were excluded, was smaller forearms in the more dominant adult females.

When compared to data that exists on communities of female yellow baboons and female long-tailed macaques, the vampire bats were also far less likely to show a consistent pattern of wins by the more dominant community members.

"Basically, with these primates, almost 100% of the time the dominant individual wins," Carter said. "With vampire bats, even when you have two individuals that are 10 rankings apart, the more dominant individual is not necessarily displacing the other one."

The findings suggested that young males are subordinate to adult

females, and the same is likely to be true for adult males because they are smaller than female vampire bats. Previous research has shown that male vampire bats do compete with each other and fight—and within a colony, males tend to focus on establishing territory rather than carrying on social relationships.

A comparison of group-level dominance measures between female vampire bats and 14 other documented female mammal groups—including African elephants, bison and numerous primates—placed the bats as either 12th or 15th in the overall dominance ranking, depending on the metric used.

Though the single study of animals in captivity doesn't provide all the answers, the research does suggest vampire bats live in communities that are "more fluid and open," Carter said. A fluid and open society is different from, but not necessarily better than, a group characterized by dominance and hierarchy, he noted. A clear power structure actually helps prevent conflict.

"In a group of animals that's always together, it's really important to work out who's dominant, because when you come across food, you all come across that food together," he said.

"With vampire bats, they have this society inside of a tree, and all of the relationships are worked out. But we think vampire bats don't hunt as a stable group—they go out and forage, and come back together. So what that means is that they're not always coming across a food resource together and having to decide who's going to get access to it first."

More information: Rachel J. Crisp et al, Social dominance and cooperation in female vampire bats, *Royal Society Open Science* (2021). [DOI: 10.1098/rsos.210266](https://doi.org/10.1098/rsos.210266)

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