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## How a flying fox keeps his harem

By Victoria Gill

Science reporter, BBC News



Male grey-headed flying foxes maintain harems of females

### Researchers have discovered a secret of sexual success for flying foxes.

Males with relatively high levels of testosterone in their blood are better able to maintain their "harem" of choosy females, says a study.

The authors report in the Royal Society journal *Biology Letters* that this link is only evident during breeding season.

A better understanding of the reproduction and behaviour of these bats, say biologists, could help efforts to conserve them.

The team studied grey-headed flying foxes, which are fruit-eating bats that live in colonies of up to 20,000 animals.

"This species is in decline," said lead author Stefan Klose from the University of Ulm in Germany. "And flying foxes disperse seeds so they're really important for ecosystems."

Dr Klose and his colleagues studied a colony of the flying foxes in New South Wales, Australia.

"In these colonies you see flying foxes hanging everywhere - it looks absolutely random, but that's not the case," Dr Klose told BBC News.

"Every metre of branch that you see is someone's territory. And within that [male's] territory, there is a group of females. The size of that group depends on the attractiveness of the male."

Dr Klose and his team counted the number of females in each male's harem then captured a group of males using a special device to remove the bats directly from their branches.

"We kept the males in captivity for three days, and during that time we took a blood sample to determine the testosterone levels," explained Dr Klose.

"Then we released the males back into the colony and watched where they went."

During the mating period, males with high testosterone were better able to reclaim their harems.

"This was when all the matings took place - when it really mattered,"



“ Every metre of branch that you see is someone's territory ”  
Stefan Klose, biologist

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said Dr Klose.

He explained that one of the roles of testosterone, which is the primary male sex hormone, is the mediation of aggression. So a male with high testosterone levels is likely to have more confrontations with other males.

"If you can afford high testosterone because you're strong and you're very healthy, then you're able to reap the benefits," explained Dr Klose. "So you will potentially get a lot of females in your territory and have a lot of offspring."



Males with higher levels of testosterone are likely to be more aggressive

He also suggested that a larger territory might be a "quality indicator" to females.

"It's all about female choice," Dr Klose said. "So you could imagine that the females think that if a male is able to defend a large territory in an attractive location, he must really be a hotshot."

He also stressed that the work could inform conservation efforts, as there are often attempts to relocate flying fox colonies away from residential areas.

"People use smoke and noise to drive them away, because they perceive them as noisy or stinky," said Dr Klose. "But when we released our males, all of them returned to their colonies."

Ignacio Moore, an animal behaviour scientist from Virginia Tech in the US, who was not involved in this study described it as "a nice example of basic physiology and behaviour being useful for conservation".

"The implication is that relocating the animals during the breeding season will not work, as they will simply return," he told BBC News.

"Suitable habitat must be made available before the breeding season for the animals to inhabit."



Flying foxes live in colonies of up to 20,000 animals

Elizabeth Atkins-Regan, a biologist from Cornell University in Ithaca, New York, pointed out that age could also be a factor in the animals' ability to keep their harems.

"Perhaps older males have higher testosterone and also are more successful at regaining harems," she said.

"It's hard to know whether the higher testosterone is the cause of the greater success, or whether success is due to something else like experience. I very much hope the authors will continue this research to find out whether there is a causal relationship."

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