

Bats split on family living

January 24 2013



Daubenton's bat. Credit: Wikipedia

For the tiny Daubenton's bat, the attractions of family life seem to vary more with altitude than with the allure of the opposite sex.

For more than a decade, a team led by Professor John Altringham from the University of Leeds' School of Biology has studied a population of several hundred [bats](#) along a 50-km stretch of the River Wharfe. They monitored roosts in Ilkley and Addingham, upstream in the market town of Grassington and higher still in the villages of Kettlewell and Buckden.

The researchers found that all Daubenton's bats in nursery roosts in lowland areas of Wharfedale during the spring and summer were females and their offspring.

Male bats were mostly restricted to a windier, Heathcliff-like existence in roosts at the top of the Dales.

But the researchers were surprised to find a small oasis of [cohabitation](#) in Grassington, sandwiched between the bustle of the women-only childrearing in the [lowlands](#) and the more relaxed lives of the bachelors in the highlands.

Professor Altringham said: "Low down the dale, the females appear not to tolerate [males](#) and we assume they won't let them in the roost. They don't want anything to do with them. High in the dales, all the roosts are bachelor pads. But in the middle, at Grassington, males and females live together—the social structure changes with the environment"

"One possible reason for not finding males low down the valley could be that the mothers just want to avoid competing with males for food. It takes a lot of insects to make the milk needed to feed their young," Professor Altringham said.

"But it is also possible that the males choose not to roost with the females. When you look at the nursery colony in Ilkley, mothers and pups often have a lot of ectoparasites like ticks and mites. In a warm, crowded nursery, parasites can thrive, especially if there's less time for good personal hygiene. Parasites not only make life uncomfortable but can affect a bat's health. The males that live by themselves are usually very clean in their bachelor pads, so you can understand why they might not want to move in," he added.

At Grassington, which is deep in the Yorkshire Dales National Park but

not as high as Buckden and Kettlewell, the bats have a completely different [social structure](#). Both male and female bats live with the young throughout the spring and summer in roosts in the stonework of the old Dales bridges and in holes in ash trees.

"Females may roost as high up the dale as Grassington because they have these warm, cuddly males to bunk up with. This way, females use less energy keeping warm and babies grow faster," Professor Altringham said. "In these marginal conditions, they may just tolerate a few males to keep them warm. Otherwise they kick them out. Why do the males co-habit if they are going to get parasites all over them? Well, that may be down to the usual answer: sex."

Although male and female Daubenton's bats usually live apart throughout the spring and summer, they meet when they begin flying to caves in late summer.

Professor Altringham said: "In and around these caves the bats gather in huge numbers to mate, in a behaviour known as swarming. This is clubbing for bats, with males displaying to females in lengthy acrobatic chases. As winter closes in, these caves will ultimately be their hibernation sites.

"There are nearly 2,000 cave entrances and hundreds of kilometres of cave passages in the Dales and these attract bats from all over Yorkshire, Lancashire, Cumbria and beyond for mating and hibernation. The males in Grassington may be giving themselves the opportunity to mate with the females late in the summer before they even get to the caves."

The researchers have built up a detailed picture of social and sexual behaviour by genotyping hundreds of individuals. The evidence gathered from this supports the theory that the Grassington males enjoy an advantage in mating.

"At Grassington, most of the fathers of bats born there spent the summer with the females. If we look at pups in Addingham and Ilkley, their dads were males caught when swarming at caves. So, as well as two different mating systems, you have distinct social groupings. A bachelor from Buckden is always a bachelor from Buckden. He doesn't pop down to Grassington to visit the females in the summer. His only option seems to be to go clubbing in the autumn," Professor Altringham said.

The Daubenton's bat, named after the 18th Century French naturalist Louis-Jean-Marie Daubenton, is widespread across the United Kingdom and specialises in hunting insects over water. Full-grown adults weigh only 7 to 12 grams, but they can live for 20 years or more.

"These bats are the size of a shrew but have a very different lifecycle. A shrew typically spends its entire life in a few metres of hedgerow, eats and breeds with a ferocious intensity, for a year if it is lucky, and then dies. In contrast, these bats lead a complex life over a huge area and [females](#) produce only one pup a year," Professor Altringham said. "This makes bats particularly vulnerable to the problems of habitat fragmentation and climate change."

More information: Ruth L. Angell, Roger K. Butlin and John D. Altringham. 'Sexual segregation and flexible mating patterns in temperate bats,' *PLOS ONE*, [DOI: 10.1371/journal.pone.0054194](https://doi.org/10.1371/journal.pone.0054194)

Provided by University of Leeds

Citation: Bats split on family living (2013, January 24) retrieved 18 April 2024 from <https://phys.org/news/2013-01-family.html>

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