

# Ancient bats got in a flap over food

Controlled approach to prey sparked evolution of wings.

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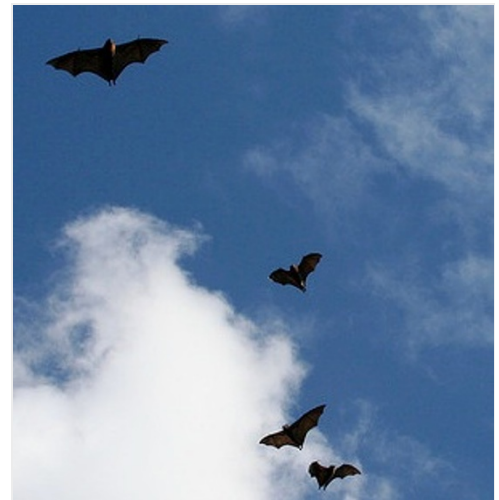
You have to walk before you can run, and — if you're a vertebrate— you have to glide before you can fly. Or so the theory goes. In evolutionary biology, gliding is widely thought to have been a prerequisite for powered flight, a transitional step along the way to fully fledged flapping.

Now, a pair of researchers is challenging that notion with a suggestion that early bats used proto-wings to flutter to the ground in a controlled manner that helped them to capture crawling insects.

Presenting today at the [annual meeting of the Society of Vertebrate Paleontology](#), Kevin Padian at the University of California, Berkeley, and Kenneth Dial at the University of Montana in Missoula described their idea, which arose from an investigation of the bat family tree. The researchers say they knew that there were no gliding species among bats or even any gliding species closely related to them, but when they expanded the scope of their search, they found that gliding vertebrates and flying vertebrates were never closely related. The observation led the pair to explore the possibility that gliding might have had nothing to do with the evolution of bat flight.

“With gliding being a habit that we rarely see in living bats and with the behaviour notably absent among their relatives, we started speculating that something else had to have led to bat flight,” says Padian.

“It is a simple but amazing observation that there are no flying lineages of vertebrates with gliders as a sister group,” says evolutionary biologist Nancy Simmons at the American Museum of Natural History in New York.



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Modern bats may not have evolved from gliding ancestors.

## Bat mobility

Bats first appeared in the Eocene epoch, roughly 50 million to 55 million years ago. When Padian and Dial looked at which modern bats are most like those ancient progenitors, they realized the best match are the climbing, cave-dwelling, insect feeders rather than the tree-dwelling, pollen, blood or fruit eaters. But this presents a mystery, because most insect-feeding bats today are fast and powerful flying animals that rely on echolocation to zero in on their prey. Palaeontological analyses of bat skulls, conducted in recent years, indicate that early bats lacked the bony structures that would be required for echolocation.

Based on this, Padian and Dial theorized that bats started out eating crawling insects that would not have required echolocation to be caught. Yet if such insects were the preferred diet of early bats, they wondered why these bats had evolved to become capable climbers that could hang upside down from cave walls.

An answer came to the two researchers while looking at video footage of a baby bat being dropped off a ledge in a lab (onto a pillow). The bat, they noticed, fluttered its wings rapidly to help control its fall. In the same way, they propose, proto-bats, when dropping down from the ceilings of caves, could use flapping to control their descent and land in the right place to gobble up prey.

“There are a number of bats alive today that drop down from a perch and grab insects that they hear landing on nearby leaves, so this idea of bats evolving as drop-down hunters seems pretty logical,” says Simmons.

Further to this, the researchers argue that bat development in the womb hints that developing a membrane between fingers at the end of the forelimbs would have been a mutation that could easily have emerged in early bats and then, over time, could have been selected for as controlled descent, and eventually powered flight, became ever more useful. “The reality is we don’t see gliding in

extant bats, it doesn't seem to be present among extinct bats, and when baby bats fall, they flutter. Gliding isn't part of the equation," says Padian.

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