Science

Scientists learn secret to hummingbirds' remarkable agility

Tests exploring how birds navigate gaps smaller than their wingspan shed new light on their 'amazing abilities'

Nicola Davis
Science correspondent
@NicolaKSDavis

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An Anna's hummingbird, four of which were observed in the tests. Photograph: Alan Mahood/Alamy

When it comes to mind-bending aerial manoeuvres, it turns out hummingbirds can give Top Gun's Maverick a run for his money.

Researchers have discovered that the diminutive creatures have two different strategies they can deploy to squeeze through gaps that are smaller than their wingspan.

Experts say the findings shed light on the longstanding conundrum of how hummingbirds in the wild manage to pass through dense foliage to reach nectar-rich flowers or tasty insects, despite being unable to tuck their wings in like other birds.

"A lot of people think of hummingbirds as being very fast, very manoeuvrable. But … these amazing abilities are in the open space where we see them. They are just the tip of the iceberg," said Dr Marc Badger, first author of the research at the University of California, Berkeley.

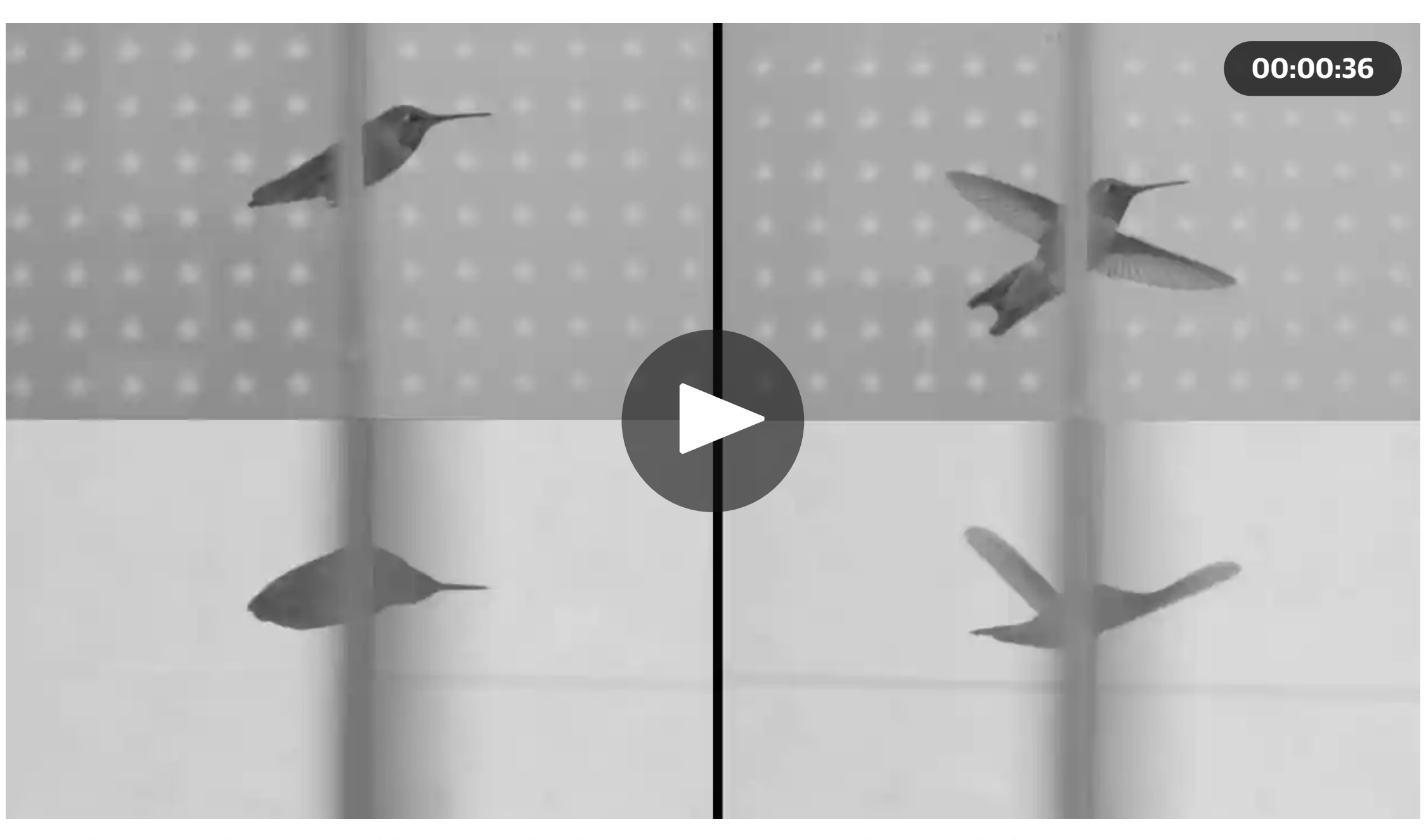
Writing in the Journal of Experimental Biology, Badger and colleagues describe how they created a setup involving four Anna's hummingbirds and two fake flowers.

Each flower only refilled with nectar when the bird visited the other flower, resulting in the birds flying back and forth between them.

The researchers then separated the flowers with one of seven different partitions featuring a circular or oval aperture, the height and width of which varied from the same size as the wingspan of the birds (around 12cm) to half that distance (6cm).

The researchers presented each of the seven apertures to each hummingbird 10 times, and recorded them making two trips between the flowers each time, resulting in 140 filmed trials per bird.

These recordings revealed that the posture of the birds as they flew through the apertures fell on a spectrum between two very different poses.



Video recordings reveal hummingbird strategies to pass through holes – video

In one extreme, the birds swept back their wings against their body and paused their flapping to rapidly pass through the aperture like a bullet.

In the other they took a slower approach in which they rolled their body and turned their head to pass sideways through the hole while continuing to flap, with one wing tilted forward and the other backwards.

The researchers found both techniques were used on most of the apertures, although for the smallest circular aperture the birds almost always used the bullet-like approach.

The team add that over the course of the experiments, the birds tended to deploy the bullet approach more often, regardless of the size and shape of the aperture.

Badger said it is possible that the birds initially adopt the more cautious sideways strategy to reduce the risk of hurtling through the partition's hole and into danger, adding that as it became clear the setup was safe, they might have switched to the bullet strategy to reduce their risk of breaking feathers.

Badger added the research reveals how the hummingbirds, which can beat their wings 40-50 times per second, can adjust their posture as they move to fly through tiny spaces.

"It's just incredible to see how they use flap-by-flap control over the wings," he said.

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