

Experts discover how zebra stripes work to thwart horsefly attacks

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Horse with patterned blanket. Credit: Martin How

Researchers at the University of Bristol have found why zebra fur is thinly striped and sharply outlined.

Their findings, published Feb. 17 in the *Journal of Experimental Biology*, reveal that stark black-white distinctions and small dark patches are particularly effective in thwarting horsefly attack. These characteristics specifically eliminate the outline of large monochrome dark patches that are attractive to horseflies at close distances.

The team theorizes that the thin back stripes serve to minimize the size of local features on a zebra that are appealing to the biting flies.

The research was led by Professor Tim Caro and Dr. Martin How, both from the University of Bristol's School of Biological Sciences.

Prof. Caro explained, "We knew that horseflies are averse to landing on striped objects—a number of studies have now shown this, but it is not clear which aspects of stripes they find aversive.

"Is it the thinness of the stripes? The contrast of black and white? The polarized signal that can be given off objects? So we set out to explore these issues using different patterned cloths draped over horses and filmed incoming horseflies."



Horse with patterned blanket. Credit: Martin How

The team found that tabanid horseflies are attracted to large dark objects in their environment but less to dark broken patterns. All-gray coats were associated with by far the most landings, followed by coats with large black triangles placed in different positions, then small checkerboard patterns in no particular order. In another experiment, they found contrasting stripes attracted few flies whereas more homogeneous stripes were more attractive.

Professor Caro added, "This suggests that any hoofed animal that reduces its overall dark outline against the sky will benefit in terms of reduced ectoparasite attack."

The team found little evidence for other issues that they tested, namely polarization or [optical illusions](#) confusing accurate landings such as the so-called "wagon-wheel effect" or "the barber-pole effect."



Horse with patterned blanket. Credit: Martin How

Now the team want to determine why [natural selection](#) has driven striping in equids—the horse family—but not other hoofed animals.

Professor Caro added, "We know that zebra pelage—fur—is short, enabling horsefly mouthparts to reach the skin and [blood capillaries](#) below, which may make them particularly susceptible to fly annoyance,

but more important, perhaps, is that the diseases that they carry are fatal to the horse family but less so to ungulates. This needs investigation."

More information: Tim Caro et al, Why don't horseflies land on zebras?, *Journal of Experimental Biology* (2023). [DOI: 10.1242/jeb.244778](https://doi.org/10.1242/jeb.244778)

Provided by University of Bristol

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