

Qualia

Vampire jumping spiders ID mosquitoes by their antennae

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Here a female *Anopheles* mosquito is biting and sucking the blood out of a human. It better watch out for vampire jumping spiders or it could become a meal itself. (Photo: CDC/ James Gathany)

Vampire jumping spiders (*Evarcha culicivora*) have many bugs to choose from, but seem to prefer eating female blood-engorged *Anopheles* mosquitoes above all else. Scientists weren't sure how the spiders picked out their favorite meals from multitudes of similarly sized insects until Ximena Nelson and Robert Jackson tested spiders to see which prey features caught their attention. The study is published in the latest issue of the *Journal of Experimental Biology*.

Anopheles mosquitoes can be distinguished from other mosquitoes by the way they position their bodies when at rest, on a 45 degree angle from the substrate instead of parallel to it. Females feed on blood while males do not, and blood-fed females can be identified by their engorged red abdomens. Male *Anopheles* also differ from females in the luxuriousness of their antennae, which are fluffier and more elaborate.

Nelson and Jackson collected male and female *Anopheles* mosquitoes, deconstructed them, and put them back together to create hybrid mosquitoes with attributes of both sexes. For instance, by combining the head and thorax of a male mosquito with the abdomen of a female, the scientists created hybrid insects with male antennae but a female's blood-engorged abdomen. They also made hybrids with female heads and male abdomens, and other combinations. Then Nelson and Jackson mounted their creations in the correct *Anopheles* posture and tested the spiders' preferences.

The vampire jumping spiders preferred intact blood-engorged females above all else, but the most interesting result came when the spiders were offered a choice between two strange hybrids. Given a hybrid female mosquito (made with the head and thorax of one female and the blood-engorged abdomen of a second female) and a hybrid made from a male head and thorax fused to a blood-engorged female abdomen, the spiders tended to go for the hybrid with the female antennae, even though both options had bellies full of blood.

Nelson and Jackson also tested the spiders with animated simulations of blood-fed mosquitoes with either male or female antennae. In these tests, the spiders consistently chose the simulated female. The spiders appear to not only be able to identify female *Anopheles* mosquitoes by their bulging, red abdomens, but also by their antennae. This research shows vampire jumping spiders engage in a complex classification and decision-making process in order to be such discerning diners.

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