

Parasites dampen beetle's fight or flight response

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Horned passalus beetle, *Odontotaenius disjunctus*, on a log. Credit: Stuart Sims, in Athens, GA.

Beetles infected with parasitic worms put up less of a fight against simulated attacks from predators and rival males, according to a study by Felicia Ebot-Ojong, Andrew Davis and Elizabeth Jurado at the University of Georgia, USA, publishing May 22 in the open-access journal *PLOS ONE*.

The fight or flight response has been well studied in a range of species, but the effect of the burden of carrying parasites on this response is often unknown—although some parasites are known to alter host behaviors. The authors of the present study collected 140 horned passalus [beetles](#) (*Odontotaenius disjunctus*) from rotten logs in forests around the University of Georgia campus. The team housed half of the beetles in optimal laboratory conditions, with plenty of wood to eat and burrow in, and half in stressful conditions where they were exposed to sunlight. They simulated attacks from predators and rival males, for example by holding the beetles' legs or tapping their wing cases, and measured their reactions.

The researchers found that beetles infected with the non-lethal intestinal parasitic worm *Chondronema passali*—which can number over a hundred worms per beetle—performed 11% fewer aggressive behaviors than parasite-free beetles. Larger beetles also fought back more than smaller beetles. They found that a stressful environment had no effect on the beetle's physical reaction to an attack, but it did increase the number of squeaks they produced—a [defensive behavior](#) that deters predators.

The authors suggest that the beetle's physical response to attack was influenced by their [energy levels](#), explaining why larger beetles were able to mount more of a resistance, and why parasitized beetles fought back less. The results indicate that parasites that don't kill their host may still affect host defensive behaviors that may impact their survival in the wild.

Davis adds: "This study demonstrates, for the first time, that an animal's ability to defend itself from a predator or rival is reduced if they have [parasites](#). While the effect is not large, it's the timing that is key—the last thing you want during a [predator](#) attack is to be hindered from defending yourself!"

More information: Ebot-Ojong F, Jurado E, Davis AK (2019) Direct measurement of fight or flight behavior in a beetle reveals individual variation and the influence of parasitism. *PLoS ONE* 14(5): e0216387. doi.org/10.1371/journal.pone.0216387

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