



Life

Losing a leg in youth changes how male harvestmen woo females

Harvestmen can shed legs when attacked by predators, but this survival tactic may have lifelong ramifications for the future sexual strategies of young males

By Jake Buehler

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▲ Harvestment can remove one of their own legs to escape a predator

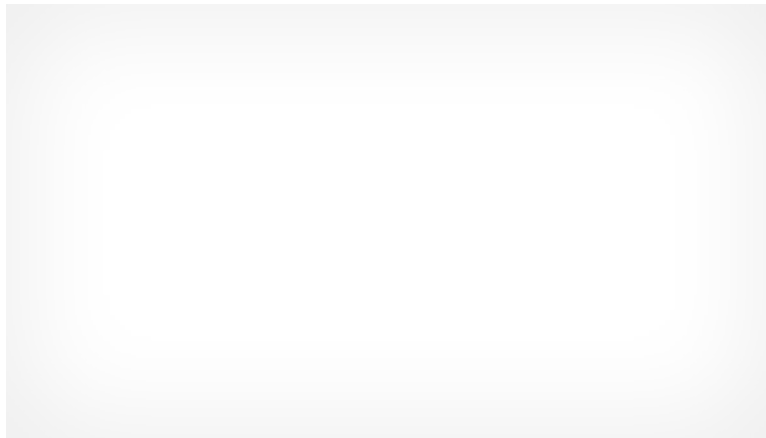
Erin Powell

g a leg early in life makes a male harvestman much more likely to grow up into a sneaker than into a fighter.

Young male harvestmen (*Forsteropsalis pureora*) – sometimes known as daddy longlegs – regularly mature into slim, meek adults if they lose a leg. Researchers think this may be because missing limbs make it more difficult to gather the food required to grow into a brawny, belligerent arachnid.

Males of many harvestmen species have evolved weaponry such as leg spurs and beefed-up head appendages that they use in battles for access to mates. In *F. pureora*, adult males come in three forms. Some have pincers in front of their mouth called chelicerae that are hugely enlarged, being either stout and plier-like in alpha males or elongated in beta males. These males brawl with their weapons, and are sometimes seven times larger than gamma males, which are nimble with small chelicerae. Gamma males avoid other males, searching far and wide for undefended females.

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[Erin Powell](#) at the Florida Department of Agriculture and Consumer Services and her colleagues were studying the evolution of these different male morphs, and they noticed that more than half of them had missing legs. *F. pureora*, like many harvestmen, can break off their legs to escape the clutches of an attacking predator – a process called autotomy. But harvestmen can't regenerate a lost leg.

“They are never going to get it back again, which has really broad implications for the rest of their life,” says Powell.

The researchers collected 86 adult male harvestmen on New Zealand's North Island, comparing the status of their limbs and which category – alpha, beta or gamma male – they fit into. The team could tell if legs were lost as juveniles or in adulthood based on the size of their scars. Males that lost legs as juveniles were 45 times more likely than those with intact limbs to become a gamma male.

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The findings may reveal a useful flexibility in the harvestman's sexual strategy, says Powell, as they're "never going to be a good fighting male without [all their] legs".

She also notes that it is possible harvestmen that were already destined to become gamma males were just more likely to lose their legs. Perhaps they were "already kind of slow to escape a predator".

Researchers have long wondered if genetics primarily drive these rare instances of distinct male morphs, or if environmental factors are key, says [Bruno Alves Buzatto](#) at Flinders University in Australia. In this case, this work makes it clear "that it's quite environmentally determined", he says.

[Ummat Somjee](#) at the University of Texas at Austin says it would be interesting to now consider how exposure to predators trickles down into other aspects of the harvestman's biology.

"If they're shaped by the number of predators in the environment, then we'd expect proportions of these different morphs to fluctuate," says Somjee. "During times of high predation, we'd expect more [gamma] morphs." That could impact mating dynamics with unforeseen evolutionary effects.

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