

Why a big horn gives beetles a tiny organ

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David Robson

RAPID metamorphosis may explain why beetle species are numerous enough to overwhelm almost any other creature on Earth. The superfast evolution of the male dung beetle's penis to wildly differing sizes in the same species could mean that new species appear within a few years rather than over millennia.

Armin Moczek from Indiana University, Bloomington, and colleagues studied four populations of one species of horned beetles in eastern and Western Australia, Italy and the US. The most striking difference was between beetles in Western Australia who had small horns and big genitals and those in the US who had the complete opposite. The variation in genital size between these two populations was as pronounced as that between 10 other species in countries across Asia, Europe, and South America.



Organs developing within the pupa must compete for a limited supply of nutrients. So if one organ grows bigger, another is stunted. Thus, males with large horns tend to have smaller genitals, and vice versa.

Strong male beetles use their horns to fight for females, but weaker males prefer to sneak off to mate while competitors are fighting. Which strategy works best depends on the size of the population. In those with more females, fighting is most successful, and big-horned beetles win most mates. But when there are not enough females, fighting is often fruitless, so evolution favours beetles with smaller horns but cunning tactics.

Because beetles with genitals of different sizes cannot mate, Moczek thinks the four populations may soon split into distinct species (*Evolution*, DOI: 10.1111/j.1558-5646.2008.00448.x). "It's unprecedented that 50 years would be long enough to generate variation normally only found in species which have been separated for millions of years," he says.

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