

Researchers Discover Size Does Matter For NZ Insects

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A male weta (right), with a movement-tracking radio receiver on its body next to a female weta.

(PhysOrg.com) -- After a night on the prowl, locating a willing mate holds the promise of a private cuddle, a whole day of canoodling, and 14-15 opportunities to "make hay." For the giant weta of New Zealand, a quirk in sexual selection means coupling owes more to speed than brawn. U of T Mississauga biology professor Darryl Gwynne and two of his former PhD students, Clint Kelly and Luc Bussière, travelled to the South Pacific to challenge the traditional predictor of evolutionary fitness that suggests strength is the most important factor for success in getting mates.



For most animals, sexual selection is a sorting process where multiple mates define reproduction. The basic concepts of selection are easy to understand. Larger and stronger males procreate more because their size allows them to intimidate smaller males. What's more, to ensure their offspring's survival, females choose mates with favourable characteristics. Strength is not the only determining factor. Attributes that appear detrimental, like a peacock's showy but cumbersome tail feathers, effectively woo peahen partners. In the case of the giant weta, however, the male is smaller than the female. Contrary to typical selection determinants, the smaller the male giant weta, the more likely its sexual prowess.

Gwynne's interest in weta, a group of New Zealand insects found in most gardens, took him to isolated Maud Island where a nature reserve reduces the threat of predators. "They're big, and not particularly mobile. We call them walking meat pies."

With no rats or ferrets to reduce the population, the three researchers began to trace the insect's mating patterns. They carefully measured the males, then placed miniature radio receivers on the enormous insects to track their nightly travel distance.

Their findings supported the mobility hypothesis: sexual selection reduces male body size relative to that of females. They noted that the males that mated most had longer legs and smaller bodies than other males – agility winning out over strength, in contrast to conventional ideas. The study was able to accurately measure and determine male mating and insemination success by counting sperm packets transferred by the male.

"We counted the spermataphores that gathered beneath the female – like used condoms on a motel floor."



The observations of Gwynne and his colleagues produced an additional discovery. Like the biggest elephant with the sharpest tusks, males with large weapons are typically subject to stronger sexual selection. In the weta world, the tree weta uses sharp mandibles to discourage aspiring suitors, maintaining a reproductive hold on his harem. Though weaponless, and smaller than the female, male giant wetas exhibit sexual selection on par with tree wetas. This unexpected correlation "likely results because of strong scramble competition with other males." On this New Zealand island, it is not the size of the bug in the conquest, but the speed of conquest in the bug.

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Provided by University of Toronto

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