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MEDIA STATEMENT

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SEX IN BEES AND ANTS: MALE WARFARE AND FEMALE POWER

Seminal fluid from one male can damage the sperm of other males in insect species where females mate with several males, according to international research carried out at The University of Western Australia and published today in *Science*.

UWA QEII Fellow Dr Boris Baer said the paper provides the first evidence that it is seminal fluid – rather than sperm – that may harm other males' sperm in the female, until a substance in the female acts to prevent further destruction.

While the quality of human sperm continuously decreases in western societies, selection has maintained very high sperm viability in social insect males because the sperm is used for fertilisation long after the males' death, which occurs during or shortly after mating. "These social insects are amazingly efficient at keeping sperm alive but it is still too early to extrapolate the importance of our results for altering human fertility," Dr Baer said.

Dr Baer and colleagues at the University of Copenhagen studied the seminal fluid of two species of bees – the multiple-mating honeybee and the single-mating bumble bee – and three species of Panamanian leaf-cutting ants, of which two are multiple-mating.

They found that only the seminal fluid of the multiple-mating species appears to have the capacity to damage the sperm of competitors. In the single-mating bumblebees, the male inserts a 'plug' into the female once she is mated which seems to prevent her re-mating, so ejaculates from different males never get into contact with each other and have not evolved a system of sperm warfare.

"The queens of ants and bees mate only during a brief period early in their lives, as young virgins, and store the sperm of their mates for the rest of their long lives in a single specialised organ, the spermatheca," Dr Baer said. "In some species such as leaf cutting ants, queens can initially store close to half a billion sperm and use them during several decades to sire a hundred million offspring."

Dr Baer said the current working models of the group can be illustrated by the 1872 painting by Jean-Léon Gérôme, 'Pollice Verso' ('Thumbs Down') [http://www.jeanleongerome.org/ecard-71820-Pollice-Verso-\(Thumbs-Down\).html](http://www.jeanleongerome.org/ecard-71820-Pollice-Verso-(Thumbs-Down).html) depicting a triumphant gladiator standing over the bodies of his enemies as wealthy women in the audience, who have given the losers the thumbs down, congratulate the victor.

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“By analogy, the arena is the females’ sexual tract, the gladiators are the ejaculates and the women have the power. Our current findings now provide first empirical support for this idea, and our current work at The University of Western Australia has started to identify those components within seminal fluid that are responsible for the effects as published in *Science*,” he said.

Dr Baer is the coordinator of CIBER, the Collaborative Initiative for Bee Research. Located at UWA, CIBER aims to intensify basic scientific research into honeybee reproduction, immunity and ecology alongside with partners from the Australian bee industry. The ultimate goal is to better understand honeybees to avoid future dramatic losses of Australian honeybees as occurring elsewhere.

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