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## The Hives of Others: Bees Wage War across Species

Australian stingless bees stage strikingly rare interspecies battles

Jan 20, 2015 | By Jason G. Goldman

Jane Goodall discovered 40 years ago that chimpanzees wage war. Until then, she thought they were “rather nicer” than humans. But her shocking observation of animal warfare was not the first. It was the second. By then scientists had known for at least 80 years that we were not the only species to kill others of our own kind. Some insects do it, too.



Thomas Fuchs

The Australian stingless bee *Tetragonula carbonaria* is notorious for inciting war, usually to usurp the hive of another. Instead of wasting time building their own hives, they just steal one and redecorate. The fights between stingless bee colonies are epic in scale, according to John Paul Cunningham of Queensland University of Technology in Australia, with “swarms from the attacking and defending hives colliding midair and fighting bees falling to the ground locked in a death grip from which neither combatant survives.”

While studying such skirmishes, Cunningham and his colleagues were surprised to find that the stingless bees were being attacked not only by other colonies of their own species but also by colonies of a different species entirely, *Tetragonula hockingsi*. This insight marks the first known description of interspecies warfare in bees—the only other instance of this type of conflict observed throughout the animal kingdom occurs among some ant species.

The stingless bees' aggression against others was so remarkable that the researchers monitored approximately 260 colonies of *T. carbonaria* in Queensland over five years to make sure they were not wrong. Because the bees are hard to distinguish by sight, Cunningham's team identified instances of usurpation of one species by the other by

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assessing the structure of the hives each year when they were opened for honey extraction. The hives of *T. carbonaria* are made up of well-organized cells built in a spiral pattern. Those of *T. hockingsi* contain cells that look haphazardly arranged. If a hive known to hold *T. carbonaria* had the structure of a *T. hockingsi* hive the following year, then that was the site of a successful seizure of territory. The researchers recorded evidence of 46 such interspecies usurpations, with victors coming from either species in equal proportion. The findings were detailed last December in the *American Naturalist*.

Cunningham also observed the daily activities of a *T. carbonaria* hive over a single winter, witnessing three major battles and collecting the dead for later genetic analyses. By the end of the winter, the hive had been successfully commandeered by *T. hockingsi*, with the invaders dragging out all remaining occupants, including larvae, and installing a new queen.

What induces thousands of bees to go into battle and risk death? One clue comes from the genetic analysis of the dead conducted by University of Queensland researcher James Hereward. He found that the new queen was most likely the daughter of the attacking hive's own queen—brought to her new home to continue the ruling species' lineage. When the reproductive capacity of the royal class is at stake, the potential benefits to either colony may outweigh the risks of massive casualties.

The trigger for a war is uncertain, Cunningham says, “especially because beekeepers can have many hives of both species living harmoniously in close proximity.” As Christoph Grüter of the University of Lausanne in Switzerland, who was not involved in the work, points out, this study highlights how much is still unknown about insect warfare and how it evolved. “The entire colony of the attacked species is wiped out, and a substantial number of attackers die as well,” he explains. “It's very unusual to have these kinds of costs among both attackers and defenders.”

Long live the queen.

*This article was originally published with the title "Cry 'Havoc' and Let Slip the Bees of War."*

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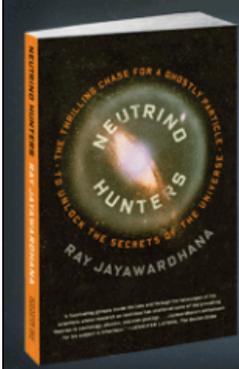


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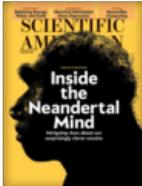
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