

European ancestry plays role in 'killer' honey bees' aggressiveness

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What causes African hybrid honey bees (AHB), also known as killer bees, to be highly defensive and aggressive? York University researchers have found it was the mixing of African and European genetics that led

to hyper-aggression in this invasive strain of honey bees.

AHBs are a genetics experiment gone wrong. Researchers in Brazil imported a [honey](#) bee subspecies from South Africa and bred them with European-derived honey bees in the 1950s. The idea was to develop a better subtropical honey bee, but bees escaped and mated with the local bees.

"The resulting bees were highly invasive and aggressive, much more than the European honey bees used by North and South American beekeepers at the time," says Associate Professor Amro Zayed of the Faculty of Science, a co-author on the paper led by previous York Ph.D. student Brock Harpur, now an assistant professor at Purdue University.

"The genetics causing this hyper defensiveness were not well known, but the prevailing wisdom was that [killer bees](#) are aggressive because South African bees are aggressive."

The new AHB colonies rapidly reproduced and spread across, not only Brazil, but South America, Central America and, by 1990, the southern United States. Today, they have completely replaced the European-derived honey bee in Brazil and are the most common honey bee from Northern Argentina to the southern United States.

The research team measured the defense response of 116 Brazilian AHB colonies using the Suede Ball test (see video by one of the researchers, Samir Kadri, a former York visiting Ph.D. student from Brazil). A suede ball is gently swung for one minute in front of the [colony](#) entrance stimulating a defense response in the bees and encouraging additional bees to sting the ball.

"We sequenced the genomes of the most aggressive colonies, which would sting the ball 90 times or more per minute, and the least

aggressive colonies," says Harpur. "We then compared the genomes of the most and least aggressive colonies to identify mutations that associate with these differences in behavior."

"The most defensive colonies in our study were more related to South African honey bees except at several regions of their genome that influence aggression. Here, they were more related to honey bees from Western Europe," says Zayed. "That is—it was the mixing of these two honey bee subspecies that led to hyper aggression."

How DNA from these two subspecies interacts to influence defense response is an important next question.

More information: Brock A Harpur et al, Defense response in Brazilian honey bees (*Apis mellifera scutellata* x spp.) is underpinned by complex patterns of admixture, *Genome Biology and Evolution* (2020). [DOI: 10.1093/gbe/evaa128](https://doi.org/10.1093/gbe/evaa128)

Provided by York University

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