How honeybees do without males

9 June 2016

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Most animals reproduce sexually, which means that both males and females are required for the species to survive. Normally, the honeybee is no exception to this rule: the female queen bee produces new offspring by laying eggs that have been fertilised by sperm from male drones. However, one isolated population of honeybees living in the southern Cape of Africa has evolved a strategy to do without males.

In the Cape bee, female worker bees are able to reproduce asexually: they lay eggs that are essentially fertilised by their own DNA, which develop into new worker bees. Such bees are also able to invade the nests of other bees and continue to reproduce in this fashion, eventually taking over the foreign nests, a behaviour called social parasitism.

The explanation for this unique behaviour is unknown, however a research team from UU has come closer to uncovering the genetic mechanisms behind it. The team sequenced the entire genomes of a sample of Cape bees and compared them with other populations of honeybees that reproduce normally. They found striking differences at several genes, which can explain both the abnormal type of egg production that leads to reproduction without males, and the unique social parasitism behaviour.

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"The question of why this population of honeybees in South Africa has evolved to reproduce asexually

is still a mystery. But understanding the genes involved brings us closer to understanding it. This study will help us to understand how genes control biological processes like cell division and behaviour. Furthermore understanding why populations sometimes reproduce asexually may help us to understand the evolutionary advantage of sex, which is a major conundrum for evolutionary biologists, says Matthew Webster", researcher at the Department of Medical Biochemistry and Microbiology at Uppsala University.

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More information: Andreas Wallberg, Christian W. Pirk, Mike H. Allsopp, Matthew T. Webster. Identification of multiple loci associated with social parasitism in honeybees. *PLOS Genetics* (in press) dx.doi.org/10.1371/journal.pgen.1006097