

# The ant queen's chemical crown

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The defining feature of social insects is that societies contain queens, which specialise in laying eggs, as well as workers, which are mostly infertile but take care of the offspring and the nest. However, when the queen dies or is re-moved, workers begin laying eggs of their own. Previous observations have suggested that queens possess a specific pheromone which keeps the workers infer-tile, but the pheromone has never been identified except in the well-studied honeybee.

Queen pheromones have a lot to tell us about how sociality evolved. For example, if the pheromone was found to be brain-washing the workers into doing something that was bad for them, this would suggest that sociality is rife with hidden conflicts. Alternatively, the pheromone might be more like an advertise-ment that demonstrates to the workers that the queen is doing a good job. Workers that can smell that their queen is laying lots of eggs are expected to remain infertile and let the queen do what she does best.

After identifying a candidate queen pheromone in the black garden ant, researchers from the Centre for [Social Evolution](#) at the University of Copenhagen (Luke Holman, Charlotte Jorgensen, John Nielsen and Patrizia d'Ettorre) made a synthetic copy of the pheromone to definitively test its function. They found that worker ants separated from their queen developed large [ovaries](#) in preparation for laying eggs.

However, if the orphaned ants were given a glass model queen coated in synthetic queen pheromone, they remained infertile. The authors also found that the queen's eggs are covered in pheromone, and that sick

queens produced less [pheromone](#). Together, these results suggest that the queen pheromone lets the workers know that the queen is laying many eggs and is in good health.

The queen pheromones of other [social insects](#), including [wasps](#) and termites, remain to be found. More will hopefully be discovered soon, and we will be able to determine whether there are universal queen pheromones, or whether they are highly specific to each species. This will reveal how fast the pheromones evolve and shed light on why specific chemicals became queen pheromones.

Provided by University of Copenhagen

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