The gene that determines the sex also determines whether the wasp smells male or female. ◆ Photo Jitte Groothuis

The ‘AXE effect’ in parasitic wasps

Insects can’t talk but they do communicate by sending chemical messages. Lots of these messages have to do with reproduction. Not unlike humans, really. Entomologist Eveline Verhulst and her group have discovered that a gene called Doublesex is a determining factor in this chemical communication.

Verhulst has been studying the role of Doublesex in the lives of parasitic wasps for some time. The gene regulates sexual differentiation in the offspring. It now turns out that the gene also controls the production of pheromones and other sex-related scent molecules. That control takes three different forms, as was demonstrated by switching off Doublesex in male *Nasonia vitripennis* wasps.

Appeal

This makes the males lose their appeal and their ability to make females succumb to their advances. That appeal operates through two different systems: attraction at a distance and recognition from close by. The pheromones that have an effect at a distance are volatile and are released from the wasp’s abdomen. The pheromones that have an effect from close by are oily hydrocarbons on the insect’s skin.

When Doublesex is switched off, males hardly make either category of pheromone anymore. As a result, they lose their sex appeal and their ability to distinguish between males and females. In fact, other (untreated) males see these males as females. So when Doublesex is switched off, the males are feminized.

The gene that determines the sex also determines whether the wasp smells male or female

Chemical analysis of the hydrocarbons on the skin revealed that the main component of the ‘perfume’ was an alkene with the code name Z9C31. Applying synthetic Z9C31 to the ‘faulty’ males restored their manly odour as effectively as AXE deodorant. Even if the effect in this case was to put off other males rather than attract females. RK