

Scientists develop 'artificial female moth'

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Nikolay Dimov of the MESA+ research institute at the University of Twente has developed a new device for investigating the behaviour of insects. The device was inspired by the female moth, which attracts males using chemicals known as pheromones. The device – which is in effect a miniature laboratory – is able to reproduce these pheromones and release them into the air. In a wind tunnel, this piece of technology proved just as irresistible to male moths as a virgin female moth. Dimov will defend his PhD thesis on this subject on Friday 27 April at the Faculty of Science and Technology.

Many insects communicate with each other by releasing chemical signals, which are also known as pheromones. For example, female moths give out specific chemicals which they use to attract males. Researchers at the University of Twente have developed a device (known as a 'chemo-emitter system') that can mimic this process. The device has been developed as an aid for researching insect behaviour.

Smaller than a postage stamp

The system consists of two parts – a micro-reactor and a micro-evaporator. Both of these parts are smaller than a postage stamp. Using '[moth](#) enzymes', the micro-reactor produces a very small quantity of the pheromones that female moths use to attract males. And just as in real moths, the quantities involved are truly miniscule – just a few nanograms (1 nanogram is 0.000000001 gram). The micro-evaporator then creates droplets of steam to transport the [pheromone](#). A micro-reactor can only produce one pheromone, but by linking several micro-reactors to one

micro-evaporator it is possible to emit a mixture of pheromones at any given concentration. The micro-reactor can be set up so that you can produce the pheromone of your choice.

The device has been developed as an aid for researchers looking at the behaviour of [insects](#). It has also been tested in a wind tunnel containing live male moths. These tests showed that the device could indeed attract male moths, just as strongly in fact as virgin female moths do. The advantage of the device, compared to traditional ways of attracting moths, is that you can use it to determine very accurately how much of each pheromone you want to release.

The research

Nikolay Dimov carried out his research at the University of Twente's Mesa+ research institute, within the Department of Mesoscale Chemical Systems. His work was supervised by Professor Hans Gardeniers. The researchers worked in a team with other researchers from the Spanish research institute CSIC, the University of Warwick, the University of Leicester and the Max Planck Institute for Chemical Ecology in Jena. The research was supported financially by the NWO (Netherlands Organization for Scientific Research).

Provided by University of Twente

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