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Hermaphrodite insect uses incestuous cloning to eradicate males

By Alice Vincent (/search/author/Alice+Vincent) | 19 July 11 (Tue, 19 Jul 2011 18:41:00 +01:00)



The hermaphrodite insect with offspring

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It may sound like a tongue-twister of terror, but a study into insect (http://www.wired.co.uk/tags/insects) "incest" has shown that the evolution of self-mating bugs may eradicate the need for males.

Hermaphrodite bugs (/http://www.wired.co.uk/news/archive/2011-07/12/hermaphrodite-butterfly) like the funny-looking *Icerya purchasi* (/http://en.wikipedia.org/wiki/Icerya_purchasi), or "cotton cushion scale", insects can reproduce without appearing to mate. However, as zoologists at Oxford University have found, their resultant offspring are not the product of independent fertilisation.

Laura Ross, who authored the study, said: "It turns out these hermaphrodite insects are not really fertilising the eggs themselves, but instead are having this done by a parasitic tissue that infects them at birth.

In a fairly creepy version of nature's desire to propagate (/http://www.wired.co.uk/news/archive/2011-03/30/frog-fitness), this parasitic tissue stems from sperm left over by the father at the time of the conception in what Ross calls "a sneaky way of having more children by mating with his daughters."

Zoologists wanted to look further into this incestuous reproduction, as its evolutionary implications are none too pretty for the male scale insects. They found that over a three-year period, the cotton cushion scale insects have

developed hermaphroditism through [evolution](#) (<http://www.wired.co.uk/tags/evolution>) as it has better benefits for the future of their species.

Wired.co.uk asked Oxford Zoologist Andy Gardner about this bizarre reproductive tactic. "For the female insects, the parasite posed a decision," he explained. "Evolving to accept and collaborate with it means they allow it to take up room and resources in their bodies which could be used to develop the normal reproductive systems. It's bad for the personal interests of the female insects. However, breeding with the [parasitic](#) (<http://www.wired.co.uk/news/archive/2011-03/04/ammonoids-trapped-parasites-in-pearls?page=2>) tissue has altruistic benefits for the future of the species, because by mating with the father, more copies of the relative's [genes](#) (<http://www.wired.co.uk/tags/genes>) are being passed on."

Gardner explained that this passing on of genes causes non-harmful inbreeding, due to the insects' [haplodiploid](#) (http://en.wikipedia.org/wiki/Haplodiploid_sex-determination_system) sex-determination system, also found in bees, ants and wasps. Unlike humans and other animals, these male insects have their sex determined by one genome, so if they are carrying a recessive gene there is no chance of it doubling in interbreeding. As a result, passing on your genetic strength by mating with infectious genetic copies of one male's sperm is a powerful thing.

Indeed, so powerful that male cotton cushion scale insects are "very rare", according to Gardner, because they are only produced if the egg doesn't get fertilised by the infective tissue. Even when one does come about, they're a bit of a curious beast: "They look very different," says Gardner. "They have wings, and they don't really do much. They tend to just bumble around, they're a bit useless."

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