

'Super males' emerge from male-dominated populations, study finds

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Males who evolve in male-dominated populations become far better at securing females than those who grow up in monogamous populations, according to new research into the behaviour of fruit flies at the University of Sheffield.

The study, led by Dr Allan Debelle and Dr Rhonda Snook in the University's Department of Animal and Plant Sciences, looked at the mating patterns of fruit flies after they evolved for 100 generations in either polyandrous populations (where several [males](#) have to compete for a single female) and monogamous populations (where each male has access to only one female).

The scientists discovered that males who evolved in polyandrous populations, where [sexual competition](#) was fierce, are much more likely to outcompete the other males and successfully mate, regardless of the population the female comes from.

In the past, the authors had also tested whether or not the courtship behaviour of these fruit flies had become different between the populations. They had found that monogamous [females](#) now prefer the courtship of monogamous males, and polyandrous females now prefer the courtship of polyandrous males - a result of the joint evolution of males and females.

Interestingly, in this study, the scientists also observed that monogamous female fruit flies seem more reluctant to mate with polyandrous male

[fruit flies](#) - but yet in 80 per cent of the cases this didn't matter because polyandrous males outcompeted monogamous males.

Dr Allan Debelle, who conducted the study as part of his PhD at the University of Sheffield with his supervisor Dr. Rhonda Snook and co-author Professor Mike Ritchie from the University of St. Andrews, said these results also have implications for how we look at the emergence of new species:

"Our research shows that when males evolve under intense sexual competition, they become more and more competitive, and basically turn into 'super males'.

"This suggests sexual competition can have two opposing evolutionary consequences. It can make courtship behaviour change between populations, which could then prevent matings between them, and lead to more diversification and eventually new species.

"But sexual competition can also produce very competitive individuals, who will mate successfully with everyone, and act against this diversification."

Dr Rhonda Snook, a co-author of the study and Reader in the University's Department of Animal and Plant Sciences, added:

"Understanding how new species form remains one of the most enduring problems in evolutionary biology. It hinges on how males and females interact with each other. By manipulating these interactions over many generations, we've been able to test the importance of two aspects of sexual interaction - male competition and the choice of females for mates. In this case, super males are the winners, even with females that prefer other males - which would prevent new species from forming."

More information: A. Debelle et al, Sexual selection and assortative

mating: an experimental test, *Journal of Evolutionary Biology* (2016).
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