Fruit fly promiscuity alters the evolutionary forces on males

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Fruit fly. Credit: John Tann/Wikipedia

Results, published in *Nature Communications*, have shown that the nature of the evolutionary forces which act on male fruit flies depend on how many mates a females has.

Over the last 50 years biologists have realised that females in most animal species mate with multiple males in their lifetimes, in contrast to

Darwin's Victorian ideas of the monogamous female.

However, it has previously been hard to work out how female promiscuity affects sexual selection: when females mate with more than one male, sexual selection can continue after mating because the sperm of rival males compete for eggs. But if females mate indiscriminately, do male adaptations for enticing choosy females become redundant?

The results of this study show that, in fact, indeed both of these changes occur. When female flies were genetically changed to become more promiscuous, sexual selection simply switched from favouring males who gain more mates (good at enticing) to favouring males who are better at post-mating competition (good at fertilizing). In particular, males were favoured who were good at mating multiple times with the same female.

Dr. Stuart Wigby from the University of Oxford, whose lab hosted the research, said: 'This work gives us new insights into the broad evolutionary principles that explain why males vary so much in nature. For example, why in some species males show spectacular displays or fight to the death for access to females, while in other species males invest in making lots of sperm or in pairing with one or a few females.'

Dr. Juliano Morimoto Borges from Macquarie University, the lead author, said: 'Because the gene we used to change female mating behaviour is very common among insects, our findings may also point to an important mechanism underpinning the evolution of insect reproductive patterns. This might either help in the development of improved ways to control insect pests or disease vectors by altering their reproduction, or at least help us understand the evolutionary consequences of attempting to do so."

The researchers looked at closely-confined small groups, which is a

relevant model for many species but is also likely to explain why the males ended up repeatedly mating with the same females rather than seeking new mates. Seeing what happens in larger, more dispersed groups will be an important future step for understanding how promiscuity interacts with ecology to shape sexual selection.

More information: Juliano Morimoto et al, Sex peptide receptor-regulated polyandry modulates the balance of pre- and post-copulatory sexual selection in Drosophila, *Nature Communications* (2019). DOI: 10.1038/s41467-018-08113-w

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