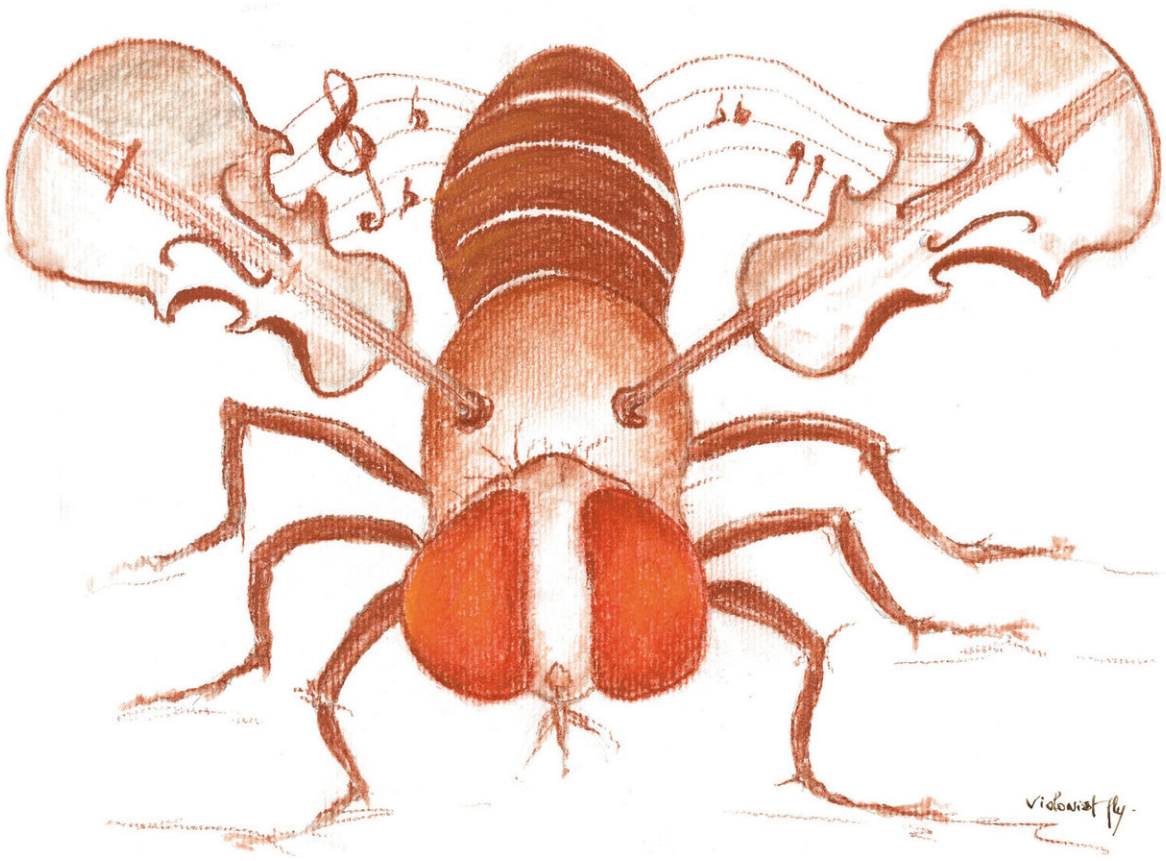
Contests for female attention turns males into better performers—in fruit flies

October 13 2017



Violin fly. Credit: Patrick Debelle

Giving females an opportunity to choose the male they mate with leads to the evolution of better performing males, according to new research into the behaviour of fruit flies performed by University of Sheffield,

University of St Andrews and the Leibniz Institute for Zoo and Wildlife Research in Berlin, Germany.

In this study, Dr Allan Debelle from the University's Department of Animal and Plant Sciences recorded the love song of male fruit flies from the species Drosophila pseudoobscura under different experimental conditions. In this species, males court females with "love songs" by rapidly beating their wings, at a rate of around 6,000 beats per minute.

In order to test how female choice can affect the evolution of male characteristics, groups of flies were kept for 110 generations in either male-biased populations (where every female could choose among several males) or in populations where monogamy was enforced (where a female only had access to one male).

At the end of this selection process – 8 years of mate choice experiments in captivity – the researchers found that males from the two types of populations differed in how fast they could beat their wings. In populations where females could choose their mate, males displayed more power and endurance when producing their love song than their counterparts that had evolved under enforced monogamy.

Dr Allan Debelle, who conducted the study as part of his PhD under the supervision of Dr Rhonda Snook at the University of Sheffield, said these results suggest that mate choice can be an important driver of the evolution of motor performance, "Our research shows that when, at each generation, females are given a choice among several mates performing energetically costly courtship, the motor performance of males in that population can respond to this selection process and progressively improve." Because singing in fruit flies involves an important muscular effort, one possibility is that males under female selection did not solely evolve better singing skills but an overall better physical performance. Consistent with this, the researchers found that such males not only sing

at higher tempo than the others, but they can also maintain a higher tempo for longer.

Dr Alexandre Courtiol, co-first author of this study, and a researcher at the Leibniz Institute for Zoo and Wildlife Research, comments, "Our findings suggest that males evolve to divest from the construction of powerful bodies and the demonstration of spectacular feats when females do not use these characteristics to discriminate (e.g. in our experiments, they were prevented to do so)."

More information: Debelle A, Courtiol A, Ritchie MG, Snook RR (2017): Mate choice intensifies motor signaling in Drosophila. *Animal Behaviour*, doi.org/10.1016/j.anbehav.2017.09.014

Provided by Forschungsverbund Berlin e.V. (FVB)