Study reveals consequences of a lifetime of sexual competition

May 1 2013

Males that spend all their time reacting to their rivals die earlier and are less able to mate later in life according to new research from the University of East Anglia. The research is the first study to quantify the consequences of lifetime exposure to rivals. Scientists looked at fruit flies, however "trade-offs" between reproduction and lifespan are common across the whole animal kingdom.

Research published today in the journal *Evolution* reveals how fruit flies (*Drosophila melanogaster*) that are subjected to continual competition from mating rivals, mate for longer and produce more offspring in early

life.

But they pay a high price – a shorter lifespan and reduced mating ability later in life.

It is the first study to quantify the consequences of lifetime exposure to rivals. Researchers say that 'trade-offs' between reproduction and lifespan are common across the whole animal kingdom, so in principle the findings could be applicable more generally.

The study was led by Prof Tracey Chapman from UEA's School of Biological Sciences and Dr Amanda Bretman, now at the University of Leeds.

Prof Chapman said: "We exposed males to rivals throughout their lifetimes and found that while this caused them to mate for longer and have a higher reproductive output – these benefits disappeared early, after the third mating.

"The males took significantly fewer mating opportunities in later life and had significantly shorter lifespans than flies which had not been exposed to rivals. Meanwhile those which had been kept on their own continued to mate into old age, accumulating more matings overall.

"In general, trade-offs between different aspects of reproduction and lifespan are very common and can be found in almost every organism in which we can measure them - including humans," she added. "We don't know whether this specific set of circumstances occurs in humans, but trade-offs in general certainly do. It could be something that researchers studying human life histories could look for."

Researchers compared flies that had been exposed to rivals with those which had not. They gave both sets of flies the opportunity to mate

regularly throughout their lives.

They recorded the length and frequency of mating for both groups, as well as the number of offspring sired by both groups.

At the end of the 78-day project, all of the male flies which had been exposed to rivals had been dead for at least four days. But more than a quarter of those which had not been exposed to rivals were still alive.

"If males die sooner in the wild, the early mating benefits seen in males exposed to competition may be more important than the benefits of living and mating for longer," added Dr Bretman. "There is a great scope for further investigations into how relevant our experiment might be in representing the natural lifespan and potential trade-offs between early and late survival and reproduction."

More information: 'Costs and Benefits of Lifetime Exposure to Mating Rivals in Male Drosphila Melanogaster' by Tracey Chapman, James D Westmancoat and Matthew J.G Gage (all UEA) and Amanda Bretman (University of Leeds), is published by the journal *Evolution*. onlinelibrary.wiley.com/doi/10 … 1/evo.12125/abstract

Provided by University of East Anglia