

What studies into male birds tell us about reproduction in later life

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Studies into male birds that produce offspring well into their old age could deepen concerns over the trend for delaying parenthood until later in life, for both men and women.

An international team of scientists, led by Dr Brian Preston from Liverpool John Moores University (LJMU), have studied the large, flamboyant houbara bustard, for insights into how aging has evolved. In their most recent work, published in *Nature Communications*, they found that, not only did males appear less able to produce offspring successfully as they aged, they also appeared to produce offspring that were of intrinsically lower quality. Perhaps most surprisingly, these declines in offspring quality were of a similar size to those resulting from maternal aging.

Dr Brian Preston, who is based at the LJMU School of Natural Sciences and Psychology, commented: "Our previous work has shown that male houbara bustards suffer declines in the number and motility of their sperm as they age, but before now it wasn't known what consequences this might have for any offspring that may be produced. Indeed, outside of humans, we know very little of the consequences of male aging on offspring quality. Our key finding, was that there were also changes in the quality of offspring produced by males as they aged, in terms of their growth rate, with the highest quality chicks produced by the very youngest males."

The researchers, from LJMU, the Universite de Bourgogne, Museum

National d'Histoire Naturelle and Reneco Wildlife Preservations looked at ten years of reproductive data on the houbara bustards and found older males produced the lightest offspring, while the younger males produced the fastest growing offspring. Surprisingly, this cost of male aging on offspring development is of a similar scale to that associated with female aging. The findings indicate that any good genes benefits that might be offered by older "proven" males will be eroded by an ageing.

Dr Preston continued: "This pattern is consistent with a mutation based aging of male germ line. Random mutations are expected to occur within a male's germ line during cell division, and so will begin accumulating from the first point at which males begin to produce sperm, and would generally be expected to have negative consequences for offspring. Since the declining growth rate of [offspring](#) from aging males in our study can only be explained by changes in the DNA within their sperm, this is the likely explanation for our findings. We were surprised to find that the magnitude of this cost of male aging was very similar to that produced by maternal aging via reductions in egg quality."

Patterns observed in humans are in line with the findings in houbara bustards and their interpretation, with paternal aging being linked to adverse reproductive outcomes, a number of genetic diseases, and some mental disorders.

The evidence is beginning to accumulate that delaying parenthood until later life can potentially have negative consequences for the children of both older men and women.

The threatened North African Houbara bustards are part of a large scale captive breeding programme in Missour, Morroco, with the aim of increasing numbers in the wild. Houbara bustards are large, long-lived birds (up to 23 years). The male Houbara bustard has striking ornamental feathers that it displays while running around in energetically

costly mating displays designed to attract a mate. Previous work by the same team has shown that the more "showy" [males](#) experienced earlier age-related declines in the quality of their sperm, effectively seem to 'burn themselves out' sooner². One of the theories to explain this apparent evolutionary anomaly is that animals might "overspend" on activities in their early life, at the cost of maintaining their body properly in the longer term.

More information: "The sperm of aging male bustards retards their offspring's development" *Nature Communications* 6, Article number: 6146 [DOI: 10.1038/ncomms7146](https://doi.org/10.1038/ncomms7146)

Provided by Liverpool John Moores University

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