

Why female deer like a stag to be a big noise in the forest

6 June 2007



Female red deer prefer the roars of larger males. Credit: University of Sussex

Impressive antlers may be the most eye-catching attribute of the male red deer, but it's the quality of a stag's mating call that attracts the female of the species, a new study from the University of Sussex, published today (Weds 6 June), has discovered.

The research was carried out by Ben Charlton (as part of his doctoral research), with Dr David Reby and Dr Karen McComb from the Centre for Mammal Vocal Communication Research, Department of Psychology, University of Sussex, and is published by the *Royal Society Journal Biology Letters*.

According to the findings, ovulating red deer hinds (females) show an active preference for male roars advertising larger males. This study provides the first experimental evidence from non-human mammals that females use an acoustic cue to body size when selecting a mate, and suggests that female mating preferences may have provided an important selection pressure for broadcasting size-related information in red deer and other mammals.

The researchers studied a group of farmed hinds at INRA's Experimental Deer Farm at Redon, just

outside Clermont Ferrand in France. Ovulating hinds were presented with re-synthesised male roars played back through two separate speakers, which simulated a natural vocal exchange between two rutting stags. The only consistent difference between the roars coming from either speaker was in the value of the vocal tract resonances (called formants), which were shifted to correspond to different size male callers.

The experiment showed that during oestrus (ovulation), which occurs for just 24 hours once a year, females prefer to move towards male roars in which lower formants indicate larger callers. The females would also prefer to wait around by a speaker simulating a larger male.

First author Ben Charlton, who graduates from the University of Sussex in July with a DPhil in vocal communication and mate choice in mammals, says: "Male roaring in red deer is clearly linked to reproduction as it only occurs during the breeding season. Red deer are therefore an ideal study species when investigating the role of vocal communication in reproduction. Males provide no parental care, so female preferences are likely to be based solely on aspects of male genetic quality, such as body size."

Acoustic cues to body size are important for hinds because mating activity in red deer continues throughout the night, when it is difficult to view prospective mates. Ben says: "Acoustic cues to male quality, such as body size, are therefore likely to be important to females selecting a mate. It's also difficult to visually assess and compare the body size of potential mates unless they are at the same distance and angle, preferably side on, to the observer."

And the reason for bigger stags being better? Ben explains: "Larger stags have higher reproductive success. Males compete fiercely for access to females and larger males are more likely to prevail

in competition with other males. Females benefit by mating with larger males because they gain the indirect benefits of larger, more competitive offspring when mated by these individuals.

Female mating preferences based on formants as acoustic cues to body size could be widespread throughout mammals and terrestrial animals in general. Co-author Dr David Reby says: "The work conducted by our group on red deer vocal communication has provided important insights into the roles of formant frequencies as cues to size in nonhuman animal vocal communication, and may provide a clue to the original role of formant frequencies in the vocal communication of our own species."

Funding for the research, carried out during August 2004 and 2005, came from the Biotechnology and Biological Sciences Research Council (BBSRC) and from the Nuffield Foundation (research grant to David Reby).

Ben Charlton will now be moving on to a new challenge studying giant panda vocal behaviour in reproductive contexts, as part of postdoctoral research at ZooAtlanta in the U.S.A.

Source: University of Sussex

APA citation: Why female deer like a stag to be a big noise in the forest (2007, June 6) retrieved 21 January 2022 from <https://phys.org/news/2007-06-female-deer-stag-big-noise.html>

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