

Honest lovers? Fallow buck groans reveal their status and size during the rut

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It is known that the phonic structure of calls produced by males during the breeding season may signal quality-related characteristics in many different types of animals. Previous research on mammals has mainly focussed on the relationship between the acoustic components of vocalizations and one aspect of male quality: body size.

In a new study, published September 3rd in the open-access journal *PLoS ONE*, researchers at the University of Zurich show for the first time that sexually selected vocalizations can signal social dominance in mammals other than primates, and reveal that the independent acoustic components – fundamental frequency (pitch) and formant frequencies – encode information on dominance status and body size, respectively. Fundamental frequency is a measure of the rate of vibration of the vocal folds. Formant frequencies result from filtering of vocalizations in the vocal tract.

In fallow deer, larger males have higher social status and are preferentially chosen by females for mating. Males vocalize only during the breeding season at potentially extremely high rates of up to 90 per minute, and the call they produce is known as a groan.

The current study found that higher-ranking males produced groans with lower minimum fundamental frequencies and to a lesser extent, with lower formant dispersion (an overall measure of formant frequencies). Larger males also produced groans with lower formant frequencies and lower formant dispersion. Dominance status was the factor most strongly

related to mating success, with higher-ranking males having higher mating success. The acoustic parameters are probably indirectly related to male mating success through dominance status. Similarly in humans, men with lower fundamental frequency (pitch) voices are perceived as more dominant and have higher reproductive success due to greater access to mates.

The researchers said, "Fundamental frequency and formant frequencies may therefore represent acoustic cues to male quality that have mainly evolved in response to male-male competition. Other aspects of male vocal behaviour, such as the long-term investment in vocal display, are also likely to influence female mate choice in fallow deer."

This study advances our understanding of the possible evolutionary mechanisms underlying the extraordinary diversity of male deer vocalizations, and in general the structure and functioning of vocal communication in mammals.

Citation: Vannoni E, McElligott AG (2008) Low Frequency Groans Indicate Larger and More Dominant Fallow Deer (*Dama dama*) Males. PLoS ONE 3(9): e3113. doi:10.1371/journal.pone.0003113
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