

Monkeys' winter death toll shows true value of friendship in natural selection

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The devastation caused by an exceptionally cold winter to a population of wild monkeys has enabled scientists to show for the first time a link between an animal's social relationships and its chances of surviving in extreme environmental conditions.

Thirty endangered Barbary macaques native to a region of the Middle Atlas Mountains in northern Morocco died over the course of the 2008/2009 winter, when snow almost one metre deep covered their home range for more than three months, drastically reducing access to food on the ground.

This death toll, most likely due to starvation, represented two thirds of the total population of two groups of macaques that a multinational team

of [primatologists](#) and ecologists has been observing as part of the Barbary Macaque Project. Only 17 monkeys survived into the spring which finally arrived in March 2009.

Dr Richard McFarland and Dr Bonaventura Majolo from the School of Psychology at the University of Lincoln, UK, analysed data they had gathered in the six months prior to the cold weather arrived, to see which socio-[ecological factors](#) best predicted the monkeys' survival.

Their findings, published in the latest issue of the Royal Society's peer-reviewed journal *Biology Letters* (26th June 2013), represent the first known scientific study to establish a correlation between [sociality](#) (i.e. the number of social relationships an animal holds within its group) and survival of extreme ecological conditions. It supports the view that factors which contribute to establishing and maintaining social relationships are favoured by natural selection.

Lead author Dr McFarland, who undertook the study during his PhD studies at the University of Lincoln, and is now a Postdoctoral Research Fellow at the University of the Witwatersrand in South Africa, said: "Previous studies investigating the link between sociality and fitness have mainly focused on the long-term reproductive benefits afforded by maintaining strong and stable social relationships. However, our findings indicate that the effect of sociality on fitness is so strong that it can predict survival in the short-term, across an unpredictable environmental event. These findings support the theory that sociality has adaptive value, and furthers understanding of the potential impact that environmental change may have on social species."

The research team, who were based at a field site near the Moroccan city of Azrou, considered several sets of data, covering the number and quality of social relationships, gender, rank and time spent feeding. They used a statistical method known as backward stepwise regression to

determine which variables best predicted the probability that an individual would survive the winter.

Co-author and founder of the Barbary Macaque Project Dr Majolo added: "We found evidence that it is the quantity, not the quality, of these social relationships which predicts an animals' survival. This may be due to the increased feeding tolerance resulting from a larger network of social relationships reducing the amount of time and energy expended in foraging. Our results also suggest that monkeys with a greater number of [social relationships](#) may also have better access to huddling partners at night and in cold periods."

The Barbary macaque is an IUCN Red List species and is listed as endangered with a decreasing population trend.

Provided by University of Lincoln

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