



## Working less to gain more: when breeding quality relates to foraging efficiency

In animal populations, a minority of individuals consistently achieves the highest breeding success and therefore contributes the most recruits to future generations.

In a paper published in *Ecology*, we collaborated with researchers from the French National Center for Scientific Research, H.T. Harvey and Associates, Stanford University, and Landcare Research, New Zealand to test the hypothesis that breeding success is directly related to foraging ability.

We used a 10-year data set collected at three Adélie penguin colonies on Ross Island, Antarctica. We specifically investigated breeding success and foraging parameters of individual penguins as they returned from year to year to raise their young.

We found that better breeders foraged more efficiently than poorer breeders under harsh environmental conditions and when offspring needs were higher. By doing this they were able to invest more time and energy in raising young.

We found that penguins showed sufficient flexibility among individuals to ensure that at least a portion of the population is capable of surviving and successfully reproducing, despite the extreme variability in their physical and biological environment. This variability is likely to be associated with climate change and, ultimately, with the species' evolution.

This study is the first to demonstrate the effects of “extrinsic” conditions (environmental conditions and offspring needs) on the relationship between foraging behavior and individual quality.

The study benefited from support by the National Science Foundation, grant OPP 0440643.

### Main Points

- More successful Adélie penguin parents are also more efficient foragers, especially when environmental conditions are challenging
- This higher foraging efficiency lets them deliver more food and spend more time with their young
- The variability in penguin foraging and breeding capabilities means that at least some penguins are able to reproduce successfully in a highly variable environment
- This is the first study (of any animals) to demonstrate the importance of extrinsic conditions on the relationship between foraging behavior and individual quality

### Paper citation:

Lescroë, A., G. Ballard, V. Toniolo, K. J. Barton, P. R. Wilson, P.O'B. Lyver, & D.G. Ainley. 2010. Working less to gain more: when breeding quality relates to foraging efficiency. *Ecology* 91(7):2044-2055.