



**Alice Brambilla, Iris Biebach, Bruno Bassano, Giuseppe Bogliani and Achaz von Hardenberg.
Direct and indirect causal effects of heterozygosity on fitness-related traits in Alpine ibex.
Proceedings of the Royal Society B. 2015 (282): 20141873.**

Abstract

Heterozygosity–fitness correlations (HFCs) are a useful tool to investigate the effects of inbreeding in wild populations, but are not informative in distinguishing between direct and indirect effects of heterozygosity on fitness-related traits. We tested HFCs in male Alpine ibex (*Capra ibex*) in a free-ranging population (which suffered a severe bottleneck at the end of the eighteenth century) and used confirmatory path analysis to disentangle the causal relationships between heterozygosity and fitness-related traits. We tested HFCs in 149 male individuals born between 1985 and 2009. We found that standardized multi-locus heterozygosity (MLH), calculated from 37 microsatellite loci, was related to body mass and horn growth, which are known to be important fitness-related traits, and to faecal egg counts (FECs) of nematode eggs, a proxy of parasite resistance. Then, using confirmatory path analysis, we were able to show that the effect of MLH on horn growth was not direct but mediated by body mass and FEC. HFCs do not necessarily imply direct genetic effects on fitness-related traits, which instead can be mediated by other traits in complex and unexpected ways.

DOI: <http://dx.doi.org/10.1098/rspb.2014.1873>

LINK: <http://rspb.royalsocietypublishing.org/content/282/1798/20141873>