

# Re: Paper: Environmental Coupling of Selection and Heritability Limits Evolution

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*Source:* <http://sci.tech-archive.net/Archive/sci.bio.evolution/2006-06/msg00143.html>

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- *From:* "Perplexed in Peoria" <[jimmenegay@xxxxxxxxxxxxxxx](mailto:jimmenegay@xxxxxxxxxxxxxxx)>
  - *Date:* Thu, 15 Jun 2006 14:37:35 -0400 (EDT)
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"Robert Karl Stonjek" <[rstonjek@xxxxxxxxxxxxxxx](mailto:rstonjek@xxxxxxxxxxxxxxx)> wrote in message  
[news:e6phq6\\$lti\\$1@xxxxxxxxxxxxxxx](mailto:news:e6phq6$lti$1@xxxxxxxxxxxxxxx)

Environmental Coupling of Selection and Heritability Limits Evolution  
A. J. Wilson, J. M. Pemberton, J. G. Pilkington, D. W. Coltman, D. V.  
Mifsud, T. H. Clutton-Brock, L. E. B. Kruuk

There has recently been great interest in applying theoretical quantitative genetic models to empirical studies of evolution in wild populations. However, while classical models assume environmental constancy, most natural populations exist in variable environments. Here, we applied a novel analytical technique to a long-term study of birthweight in wild sheep and examined, for the first time, how variation in environmental quality simultaneously influences the strength of natural selection and the genetic basis of trait variability. In addition to demonstrating that selection and genetic variance vary dramatically across environments, our results show that environmental heterogeneity induces a negative correlation between these two parameters. Harsh environmental conditions were associated with strong selection for increased birthweight but low genetic variance, and vice versa. Consequently, the potential for microevolution in this population is constrained by either a lack of heritable variation (in poor environments) or by a reduced strength of selection (in good environments). More generally, environmental dependence of this nature may act to limit rates of evolution, maintain genetic variance, and favour phenotypic stasis in many natural systems. Assumptions of environmental constancy are likely to be violated in natural systems, and failure to acknowledge this may generate highly misleading expectations for phenotypic microevolution.

Source PLoS (Free)  
<http://biology.plosjournals.org/perlserv/>

?request=get-document&doi=10%2E1371%2Fjournal%2Epbio%2E0040216

Thx, RKS. This study is interesting to me for a number of reasons. One is that it touches on issues related to maternal effects and Edser's eccentric definition of fitness. Birth weight depends more on the mother's genetics than the lamb's, and it has a big impact on

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