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Room: Seminar Room

Reversal of response to artificial selection on body size in a wild passerine

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A general assumption in quantitative genetics is the existence of an intermediate phenotype with higher mean individual fitness in the average environment than more extreme phenotypes. Here we investigate the evolvability and presence of such a phenotype in wild bird populations from an eleven-year experiment with four years of artificial selection for long and short tarsus length, a proxy for body size. The experiment resulted in strong selection in the imposed directions. However, artificial selection was counteracted by reduced production of recruits in offspring of artificially selected parents. This resulted in weak natural selection against extreme trait values. Significant responses to artificial selection were observed at both the phenotypic and genetic level, followed by a significant return towards pre-experimental means. During artificial selection, the annual observed phenotypic response closely followed the predicted response from quantitative genetic theory ($r_{\text{years}} = 0.96$, $r_{\text{cohorts}} = 0.56$). The rapid return to pre-experimental means was induced by three interacting mechanisms: selection for an intermediate phenotype, immigration and recombination between selected and unselected individuals. The results of this study demonstrates the evolvability of phenotypes and that selection may favour an intermediate phenotype in wild populations.