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Sebastian J. Schreiber, Reinhard Bürger, and Daniel I. Bolnick. 2011. The community effects of phenotypic and genetic variation within a predator population. *Ecology* 92:1582–1593.

Appendix D: Supplementary Figures on Transient dynamics

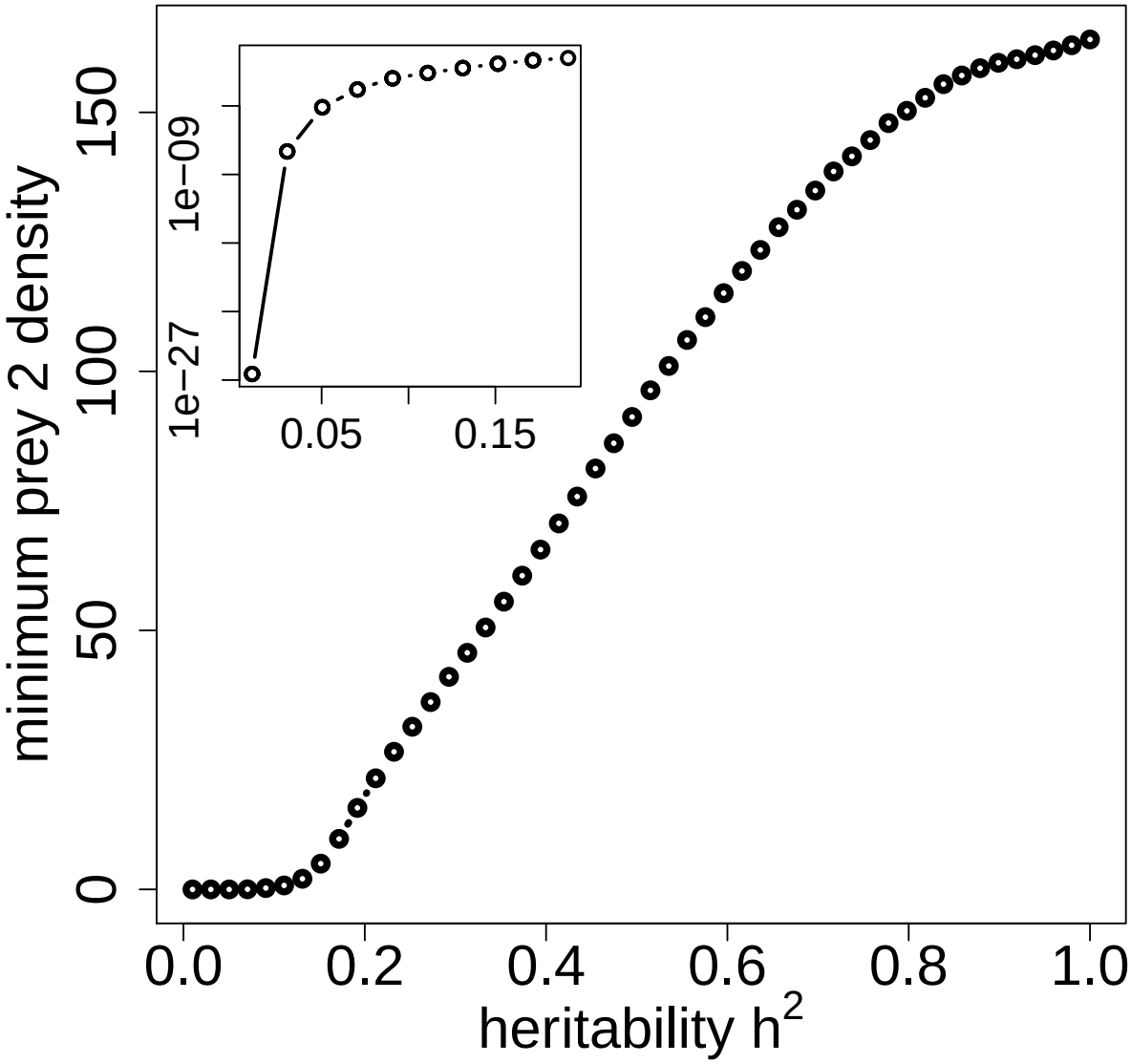

Fig. D1.— The minimum density achieved by the inferior apparent competitor following the introduction of the superior apparent competitor as a function of heritability of the predator trait. Inset shows minimum densities on a log scale for lower heritability values. Simulations were run for $2,000$ time steps and the minimum abundance of prey 2 is plotted. Parameter values are $\sigma_G^2 = 0.004$, $r_1 = 1$, $r_2 = 0.1$, $K_1 = K_2 = 1,000$, $\tau_1 = \tau_2 = 0.1$, $e_1 = e_2 = d = 0.5$, $\alpha_1 = \alpha_2 = 0.01$, $\theta_1 = -0.25$ and $\theta_2 = 0.25$.

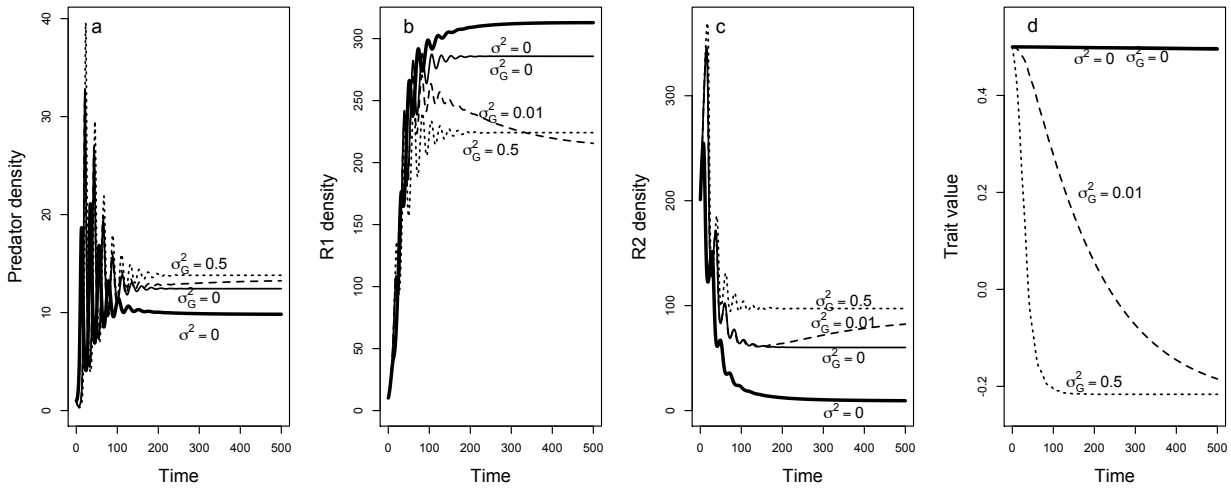

Fig. D2.— An illustration of the effect of genetic variation on the transient dynamics of (a) the predator which is initially adapted to resident prey 2 ($\bar{x} = \theta_2$), (b) invading prey 1 which is a superior apparent competitor, (c) resident prey 2 which is excluded by apparent competition in the absence of appreciable trait variation (thick black line, $\sigma^2 = 0.0001$), and (d) the predator trait mean. For each state variable we present superimposed time series for four scenarios. First, when phentoypic variance is negligible ($\sigma^2 = 0.0001$) the resident prey 2 is effectively excluded (thick lines) as prey 1 invades, despite the predator's continued adaptation to consume prey 2 (the trait mean remains at $\bar{x} = \theta_2$). For the remaining three scenarios, we vary the genetic variance while controlling for the trait variance ($\sigma^2 = 1.0$, so $\sigma_E^2 = \sqrt{1 - \sigma_G^2}$ as we vary σ_G^2). In scenario two, trait variation is effectively all environmental ($\sigma_G^2 = 0.0001$, effectively 0; thin solid line). Environmental trait variation is sufficient to maintain prey 2 where it would otherwise have been excluded. The persistence of N_2 raises the equilibrium predator density and thus reduces the density of N_1. In the third case, we assume a moderately strong trait heritability ($\sigma_G^2 = 0.5$, $\sigma^2 = 1.0$; dashed line). Unlike the preceding two cases, the predator trait is able to evolve in response to changing prey availability, resulting in rapid evolution towards a phenotype that is weakly specialized on the superior apparent competitor N_1. The equilibrium density of the predator and N_2 are increased, while N_1 is suppressed to two thirds its abundance when $\sigma^2 = 0$. Finally, we consider a case with weak genetic variance ($\sigma_G^2 = 0.01$, dashed line). Consistent with analytical results, the dynamics of this case eventually converge to the same equilibria as when genetic variance is high. However, the transient dynamics approaching these equilibria are substantially slowed by the lower heritability and thus slower trait evolution in response to selection. Parameter values used in these numerical simulations are $K_1 = K_2 = 500$; $r_1 = 0.16$, $r_2 = 0.1$, $\theta_1 = -0.5$, $\theta_2 = 0.05$, $\tau_1 = \tau_2 = 1.0$, $a_1 = a_2 = 0.01$, $e_1 = e_2 = 0.5$, and $d = 0.5$.