



Figure S1: The expected pairwise coalescent time, in units of $2N$ generation, on the background of a derived neutral allele with frequency f in the population. The dashed $x = y$ line shows our approximation $\mathbb{E}[T_2] = 2Nf$. The red dots show the mean of our pairwise coalescent simulations featuring an explicit stochastic trajectories. The solid line shows the analytical expectation from GRIFFITHS (2003), equation 93, $\mathbb{E}[T_2] = \int_0^1 x/(f(x + (1-x)f))(2-f + 2(1-f)\log(1-f)/f)dx$.