File S5 Consequences of a neglected Allee effect

Using the ABC framework again, we explored the consequences of neglecting the Allee effect when estimating other demographic parameters: the founder population size N_0, the growth parameter r, and the number of generations since the founding event. We generated 2000 pseudo-observed data sets from our stochastic model, 1000 without an Allee effect and 1000 with an Allee effect and a critical population size of 50. As the basis for estimation in ABC, we used 100,000 data sets that were simulated from a model without an Allee effect. To also explore the consequences of neglecting stochasticity, we considered two versions of the model without an Allee effect: our stochastic model with $a = 0$ and a modified version where we removed as much stochasticity as possible. That is, the population size in the next generation was not drawn from a Poisson distribution, but was set to $\mathbf{E}[N_{t+1}]$ if this value was an integer. Otherwise, we randomly set N_{t+1} to the next smallest or next largest integer with the respective probabilities chosen such that Equation (1) was fulfilled.

The priors for the demographic parameters of interest were as follows: $r \sim \text{unif}([0.05, 0.1])$ and $n_g \sim \text{unif}(\{30, \ldots, 500\})$, where unif stands for the uniform distribution. To generate values for N_0, we first drew $Y \sim \text{unif}([\ln(5), \ln(80)])$, and then set N_0 to e^Y, rounded to the next integer. The other parameters were fixed: $k_0 = 10,000, k_1 = 1000, \mu = 0.001, n_s = 10$. For each data set, we retried simulating with the same parameter combination until we obtained a successful population with $N_{n_g} \geq n_s$. We generated 100 independent genealogies for samples of size n_s taken at time n_g and computed means and variances of the entries of the site-frequency spectrum as described in File S4. Using partial least squares regression on the first 10,000 simulated data sets, we reduced this information to 20 components that served as summary statistics for ABC. As above, we used the R package abc (Csilléry *et al.* 2012) with a tolerance of 1 % and the option "loclinear'. In Figure S8, we compare the quality of parameter estimation across the four possible combinations of whether or not the true model includes an Allee effect and whether the model used for estimation was stochastic or deterministic.

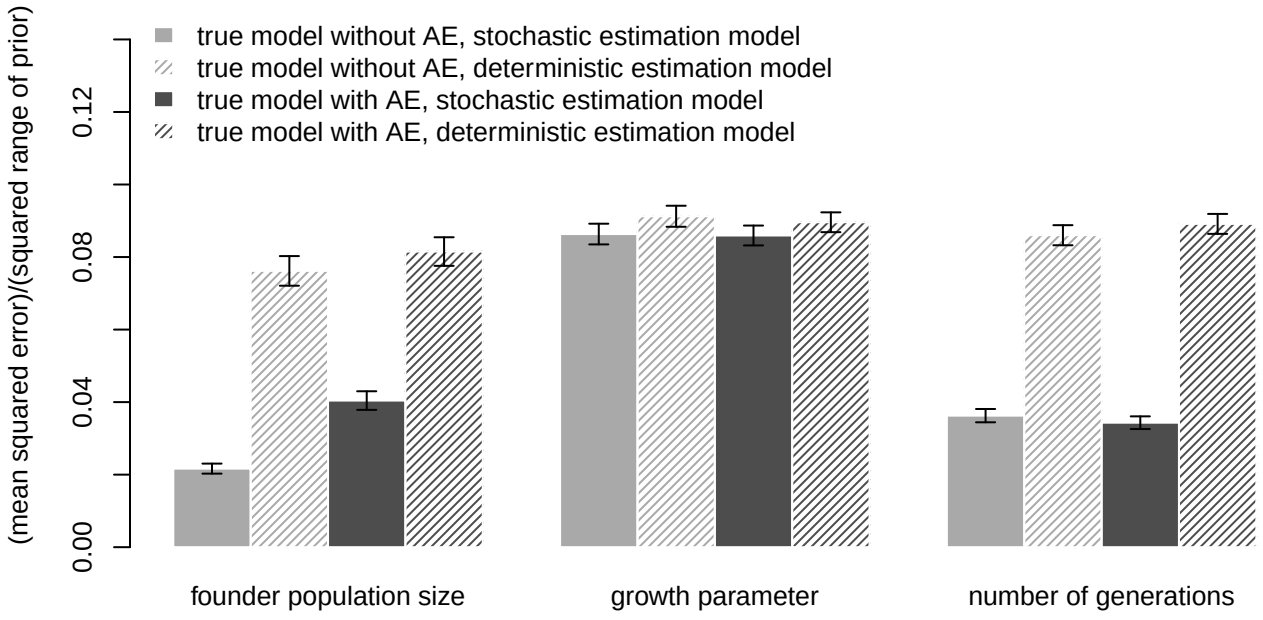

Figure S8 Mean squared error (MSE) $\pm$ its standard error, relative to the squared range of the prior for different demographic parameters in an Approximate Bayesian Computation analysis that neglects the Allee effect.