Supplementary Information

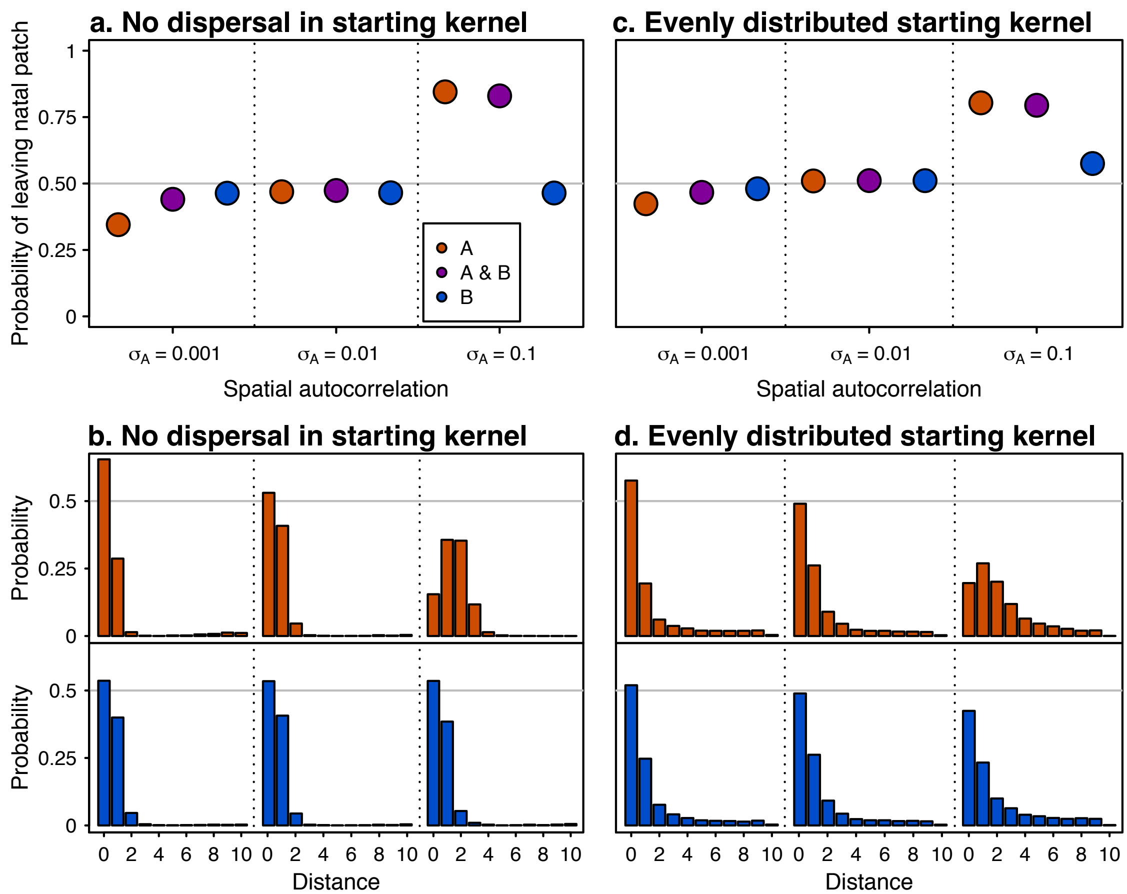

Figure S1: Population mean probability of leaving the natal patch after 2×10^5 generations, beginning with different starting dispersal kernels. The panels shown here correspond to the same cases as shown in Fig. 4 (although, only 25 replicates, instead of 100 used there). (a) and (b) show model replicates initiated with all probability in the first bin (no dispersal). (c) and (d) show model replicates initiated with probability evenly distributed across all bins.

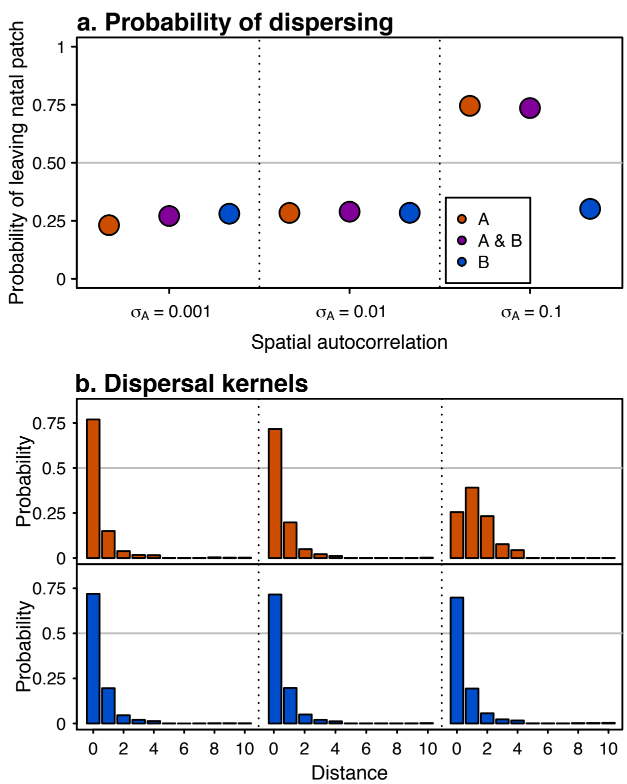

Figure S2: Population mean probability of leaving the natal patch after 4×10^5 generations with higher patch carrying capacity ($K = 100$ instead of $K = 10$ as in the main text). The three panels shown here correspond to the same cases as shown in Fig. 5. (although, only 25 replicates, instead of 100 used there).

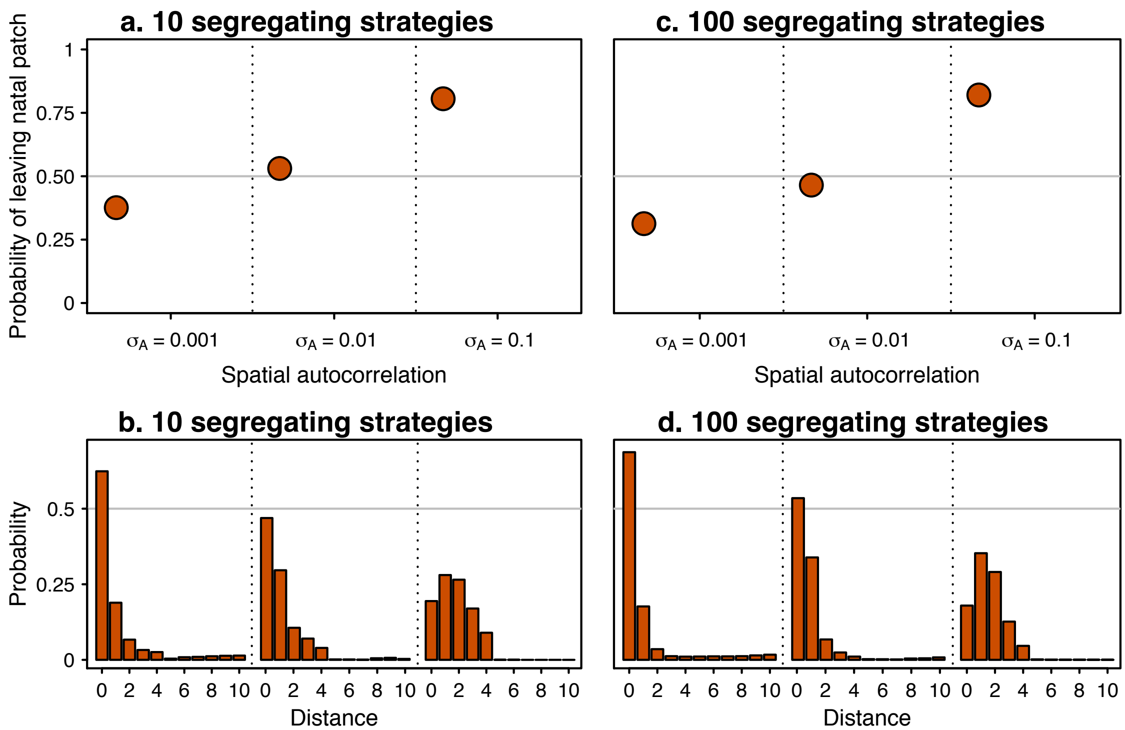

Figure S3: Population mean probability of leaving the natal patch after 2×10^5 generations with 10 or 100 strategies segregating in the population at time. The panels shown here correspond to the same cases as shown in Fig. 4 (although, only 25 replicates, instead of 100 used there). (a) and (b) show model replicates with 10 segregating dispersal strategies. (c) and (d) show model replicates with 100 segregating dispersal strategies.

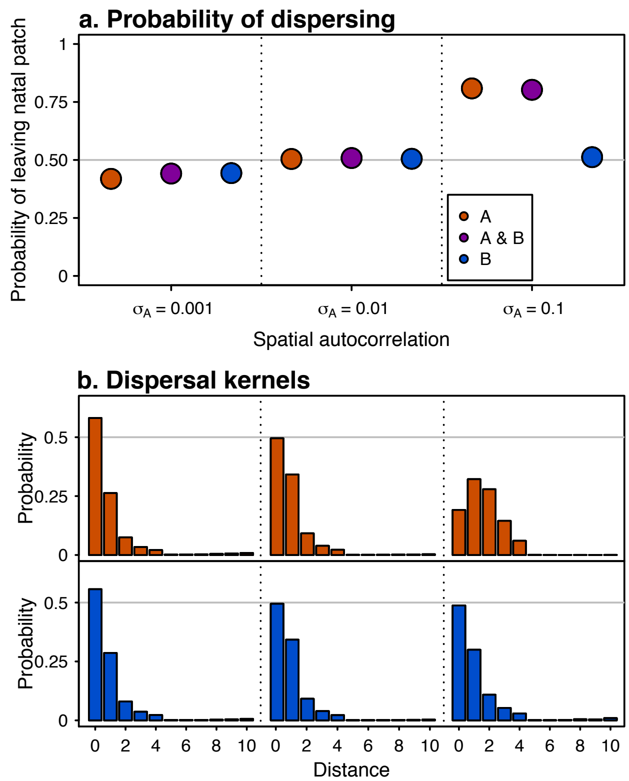

Figure S4: Population mean probability of leaving the natal patch in landscapes with weak ecological specialization ($s_a = s_b = 0.05$). Note that divergence, while weak, is present in the left-hand panel. Although the differences are modest, divergence in the right-hand panel is stronger than the case with no specialization allele presented in Fig. 4. All other parameters hold default values from Table 1.

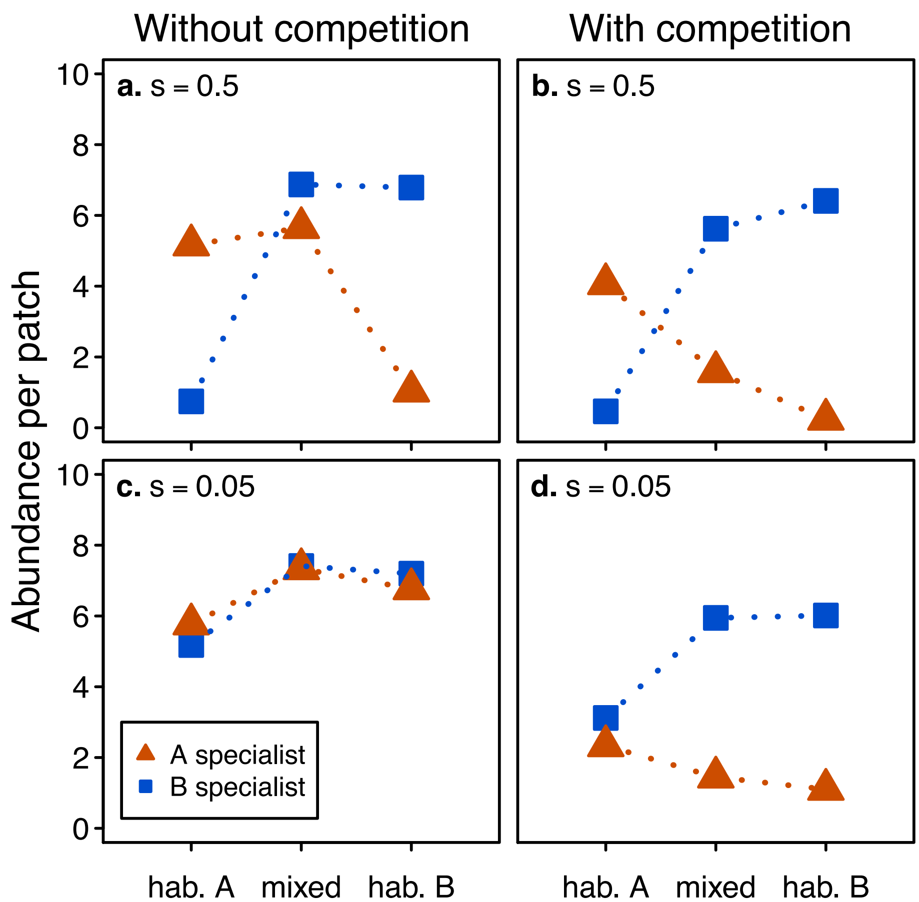

Figure S5: Total numbers of A specialists and B specialists after 2×10^5 generations in each patches of each resource type with and without competition. Panels show the same conditions as Fig. 6, but in weakly spatially autocorrelated landscapes ($\sigma_A = 0.001$, $\sigma_B = 0.01$). Note that, while the effects are consistent under strong selection (a and b), competitive exclusion is less effective here when selection is weak (compare d to Fig. 6d).

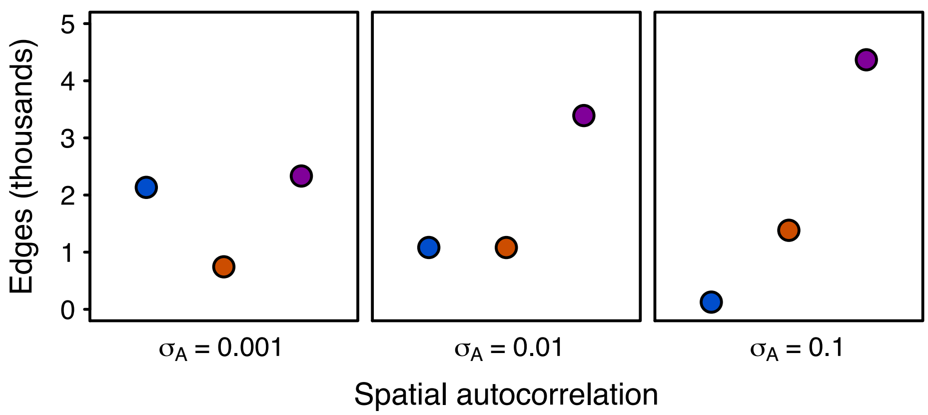

Figure S6: Number of edges between mixed resource patches and resource A (red), resource B (blue) and other mixed resource patches (purple). Spatial autocorrelation increases from left to right, with all panels showing landscapes with equal resource abundance ($f_A = f_B = 0.3$). Note that the resource with the higher spatial autocorrelation always has more edges in common with mixed resource patches, but also that mixed resource patches themselves become increasingly clustered in space as landscapes become more spatially autocorrelated.

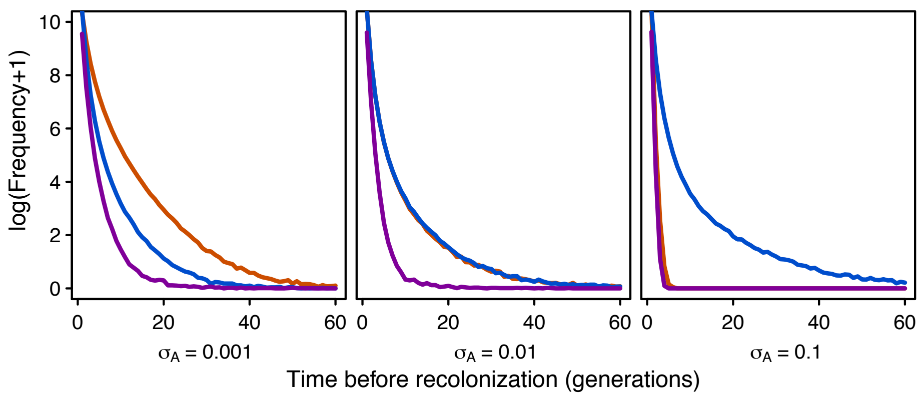

Figure S7: Patches containing both resources or highly autocorrelated resource types are re-colonized fastest. Curves show frequencies of waiting times until recolonization for patches containing resource *A* only (red), resource *B* only (blue), or both resources (purple). Different panels show three different levels of spatial autocorrelation in resource *A* (increasing from left to right).