

Question

How does monogamous mating evolve in the presence of sexual preferences for fecundity benefits?

The Model

Assumptions

- Haploid
- Two di-allelic loci
- Discrete time
- Non-overlapping generations
- Infinite population
- Constant, balanced sex ratio
- Polygynous males split their fecundity benefit

Definitions

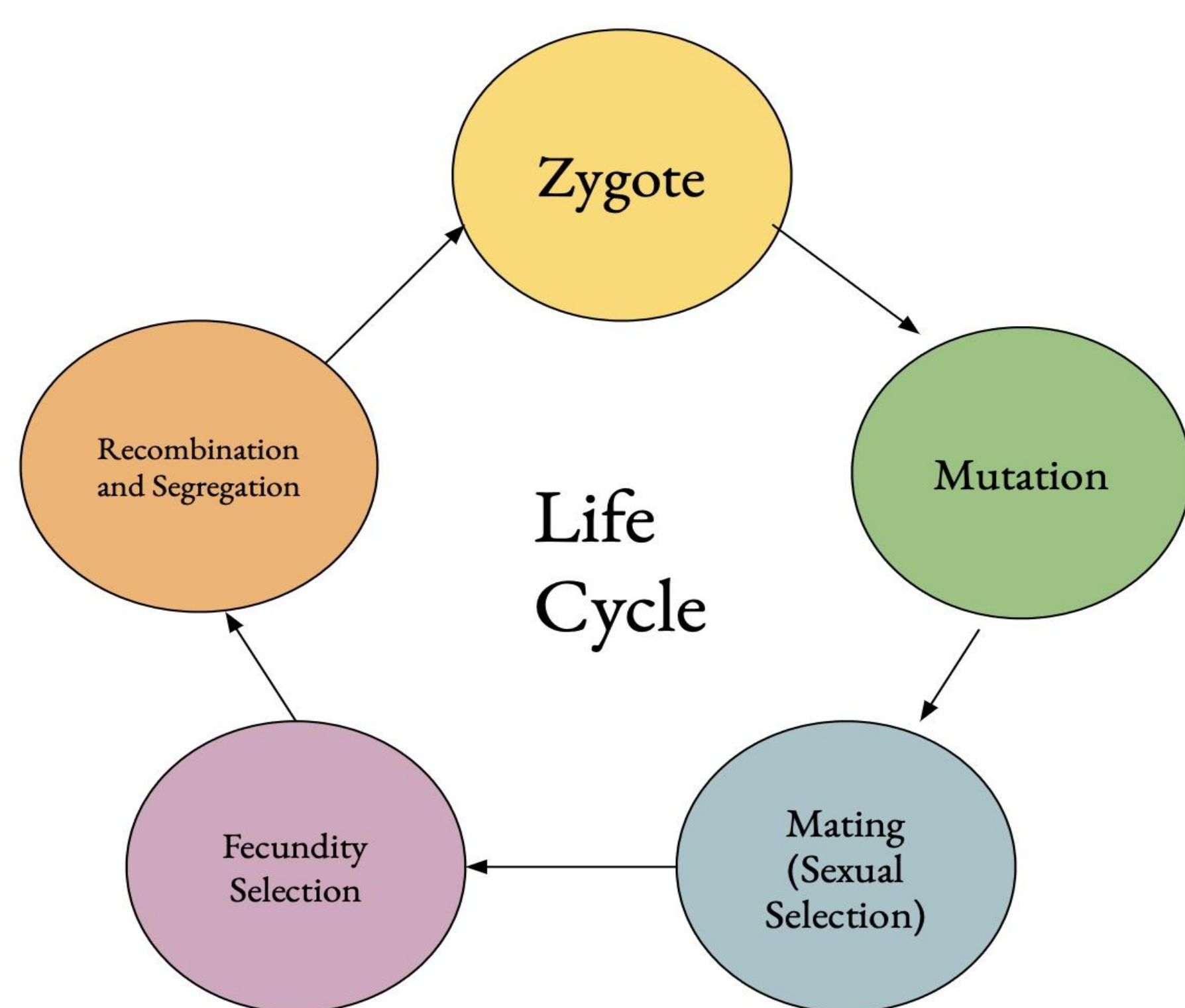
a_1 = frequency of monogamy allele

t_1 = frequency of low fecundity allele

D = linkage disequilibrium

α = female sexual selection strength

f = fecundity benefit from T_2 parents



References & Acknowledgements

Servedio, M. R. (2024). Chapter 8: Sexual Selection and Non-Random Mating, Chapel Hill.

Stern, C. A., & Servedio, M. R. (2017). Evolution of a mating preference for a dual-utility trait used in intrasexual competition in genetically monogamous populations. *Ecology and Evolution*, 7(19), 8008–8016.

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You're The One: Evolution of Monogamy via Fecundity Selection

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Monogamy coexists with
polygyny in a single
population.

Monogamy dominates with
strong sexual preferences
and **fecundity** selection.



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Results

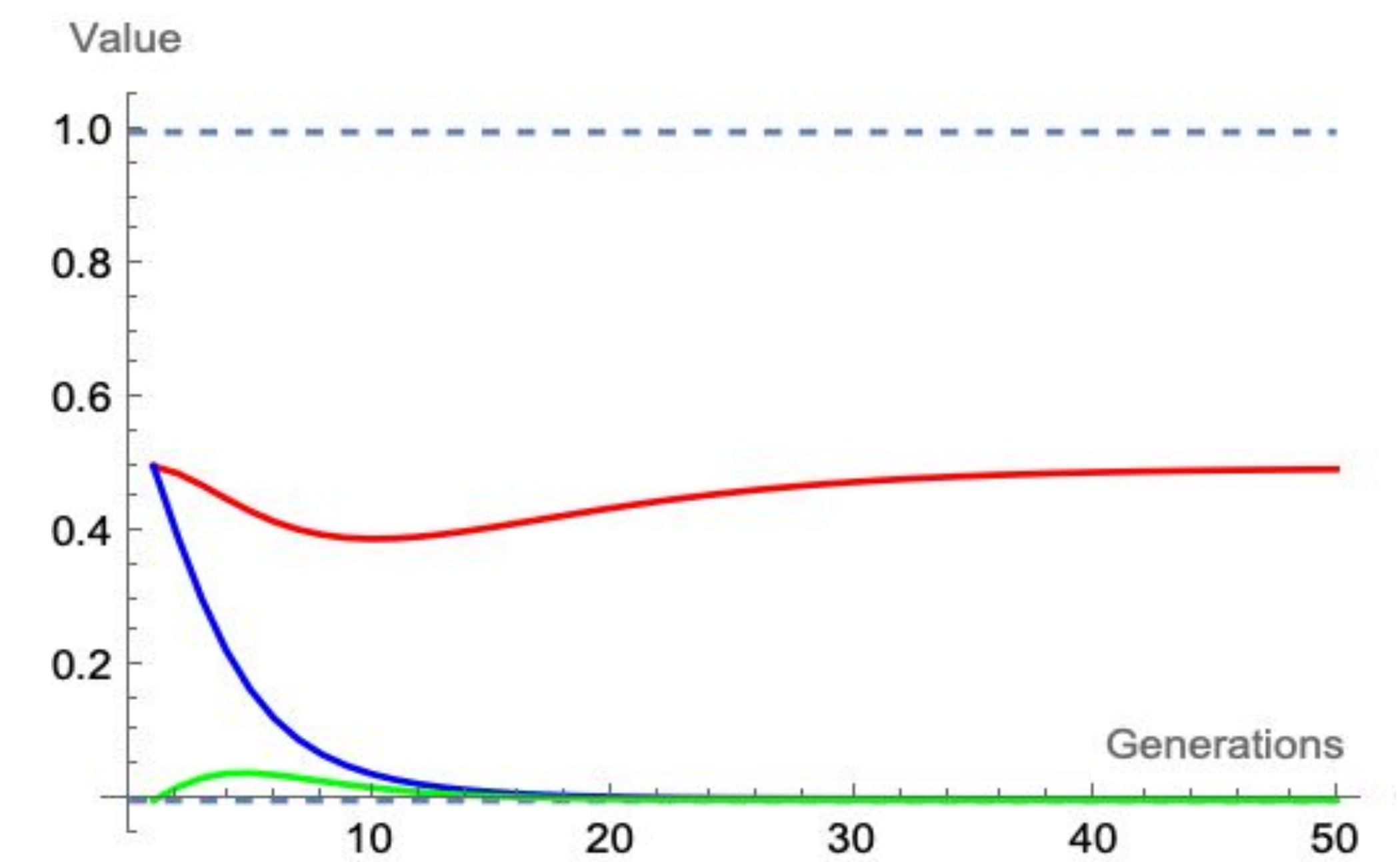


Figure 1. Frequency of the monogamy allele (red), fecundity allele (blue), and linkage disequilibrium (green) after 50 generations. Starting parameters: $\alpha = 2$, $\mu = 0.001$, $f = 0.30$

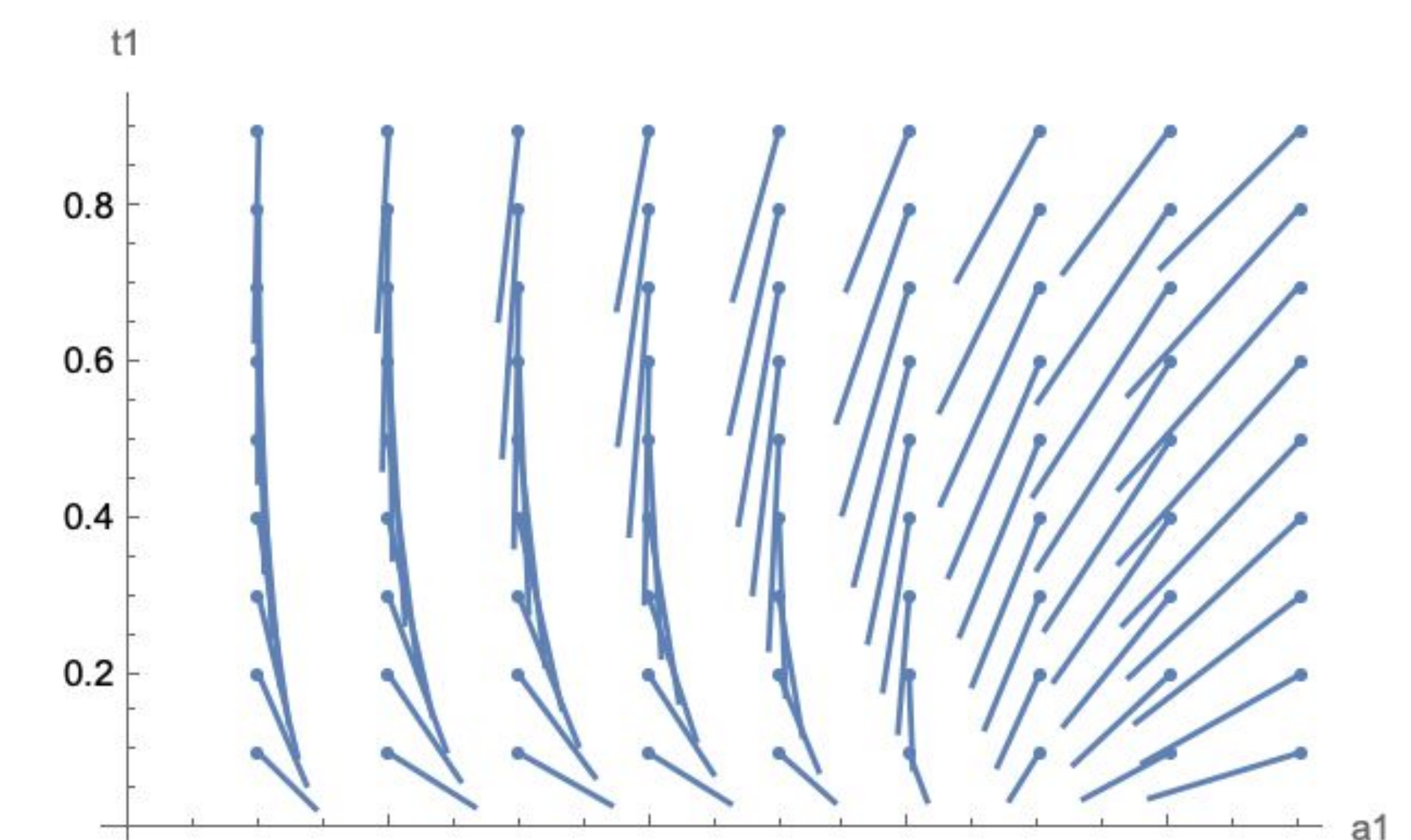


Figure 2. Coevolutionary dynamics and equilibrium of the monogamy and low fecundity allele frequencies. The lines are vectors of evolution over 2 generations. Starting parameters: $\alpha = 4$, $\mu = 0.001$, $f = 0.50$

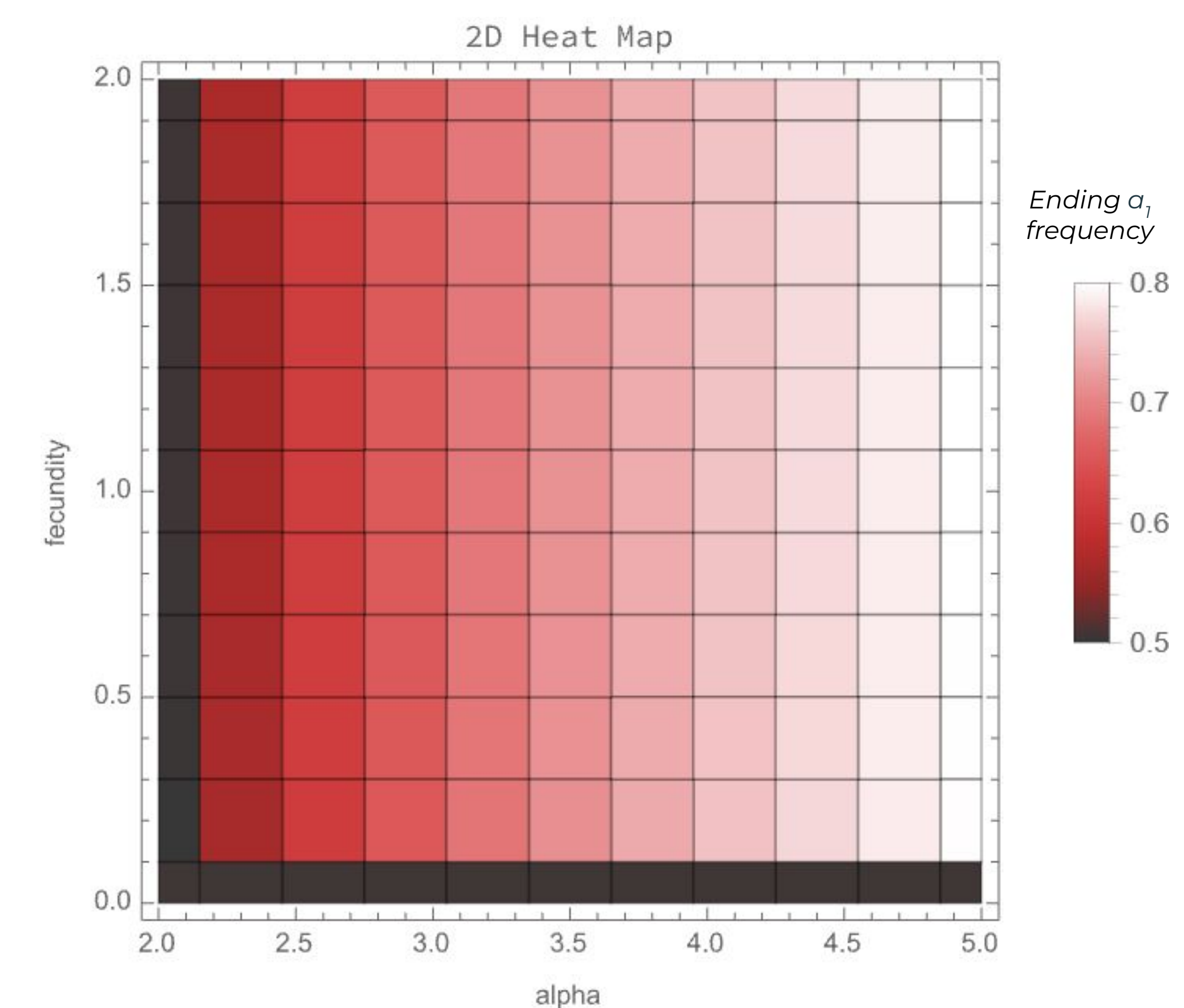


Figure 3. Heat map for the monogamy allele frequency after 500 generations, with variable f and α values. a_1 is always above 0.50. Higher α leads to higher a_1 values.