Parameter	Description	Explored range
θ	*Strength of resistance*	$[1, 50]$
α	*Relative cost of resistance of R females*	$[0, 1]$
β	*Exponent of male encounter rate*	$[\frac{1}{2}, 2]$
p0	*Initial frequency of R in the population*	[0, 1]
f0	*Initial frequency of females*	[0, 1]

Table S1 model parameters

Influence of θ and α

The densities at which females are selected to ‘accept’ a sexual life cycle upon encountering a male, and from which density upwards males can exist, depend on the strength of resistance θ and the costs of resistance α (Figures S1, S2) in addition to the parameters discussed in the main text.

At very low density, neither θ nor α influence the outcome: only females persist, with the initial frequency determining which type of female exists at the evolutionary endpoint (the neutral case). A similar independence of θ and α exists at the high end of densities: *de facto* sexuality arises here regardless of the values of these parameters (Figures S1, S2).

Intermediate densities reveal more complex patterns. With increasing costs of resistance α, the density threshold at which it pays for females to ‘mate for convenience’ is shifted to lower population densities (Figure S2). This applies for both low and high initial frequencies of *R.* The effect of θ at intermediate densities is more complex. If the initial frequency of R is high, the density threshold required for ‘mating for convenience’ increases with increasing θ (Figure S1), but if it is low, then the density threshold is instead lowered with increasing θ (Figure S1). In other words, the point from which r individuals can take over a *R* population can become shifted toward either higher or lower densities when θ increases (Figure S1).

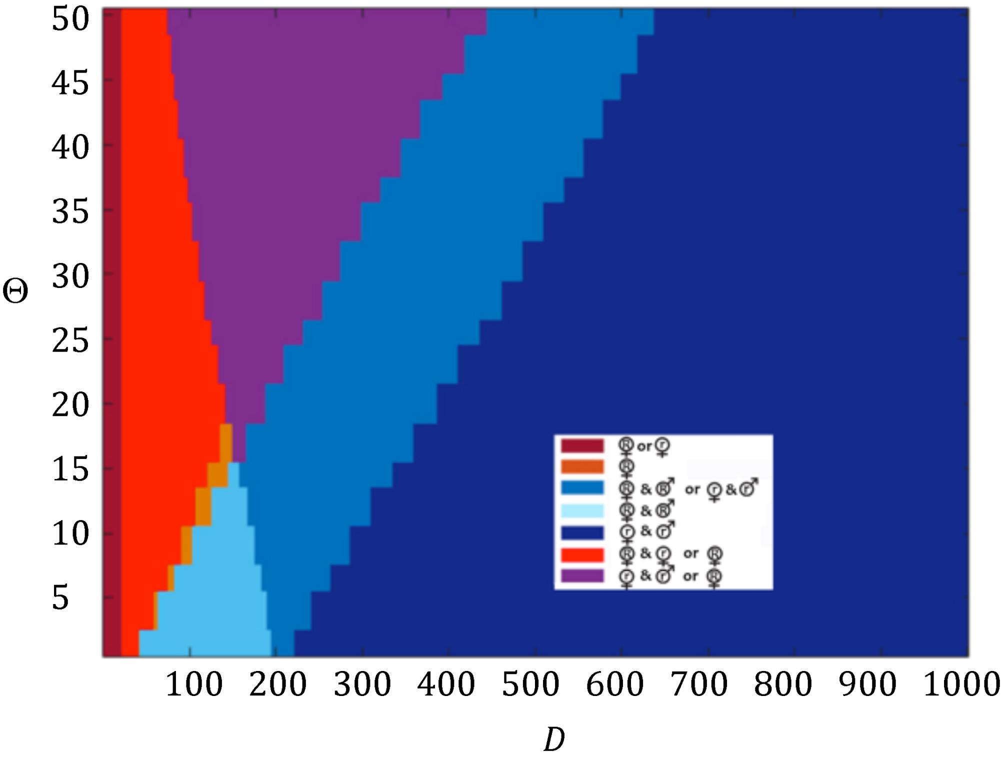

Figure S1 The influence of the strength of resistance, θ, on the population composition at equilibrium. Colours indicate the occurrence of *r* and *R* males and females for a combination of values of population density, *D*, and the efficiency of resistance, θ. The colour scheme as a whole is arranged such that blue shades indicates the occurrence of males independent of the initial genotype frequencies, whereas in the purple area males existence depends on the initial genotype frequency. Each outcome is shown combining information from 2 runs: an initial frequency of *R* individuals of 0.001 and another of 0.999. If the legend associates a given colour with just one outcome, then this outcome is reached from both initial frequencies. Several of the colours yield two outcomes depending on initial frequencies: for example, at population density D = 300 and θ = 20, males and females persist at equilibrium, but the identity of the persisting genotype depends on the initial genotype frequency. Note that θ does not impact the outcomes if density is very low or very high. Parameters used: α = 0.01 and β = 1.

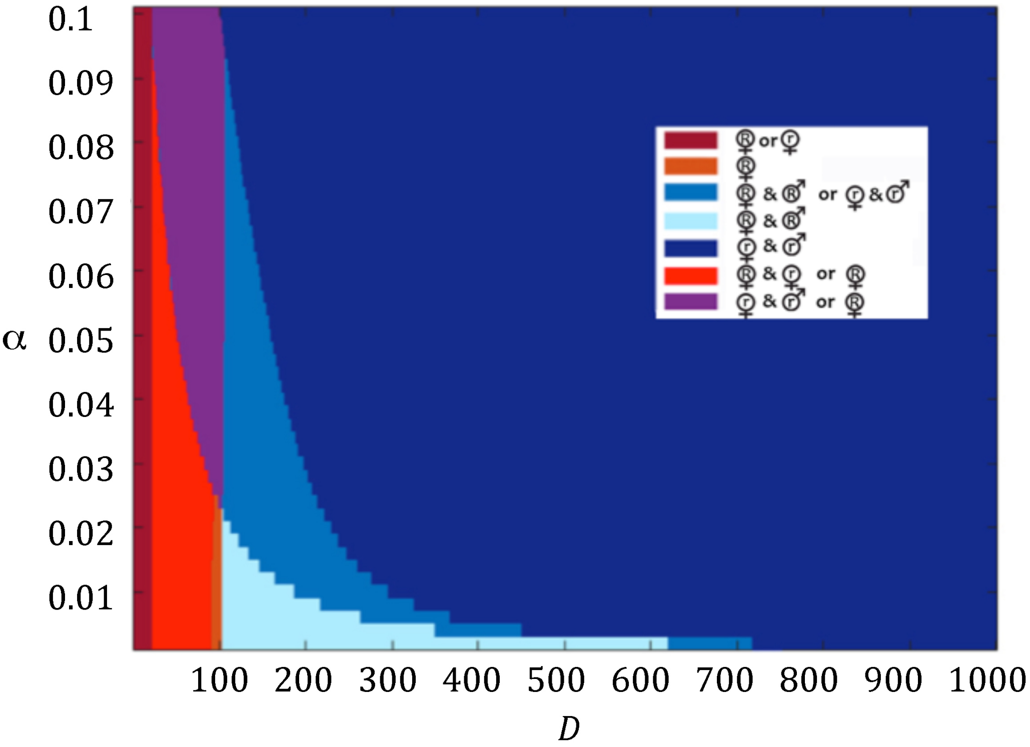

Figure S2 The influence of the costs of resistance α on the population composition at evolutionary equilibrium, for different values of population density D. The outcome is shown combining information from an initial frequency of R individuals of 0.001 and 0.999, with the colour indicating the possible outcomes, similarly to Figure S1. For example, at population density D = 200 and α= 0.02, males and females persist at equilibrium, but the persisting genotypes depend on the initial genotype frequency. Blue colour indicates the occurrence of males independent of the initial genotype frequencies. At very low and high densities there is no influence of α. Other parameters: $\theta = 5$ and β = 1.

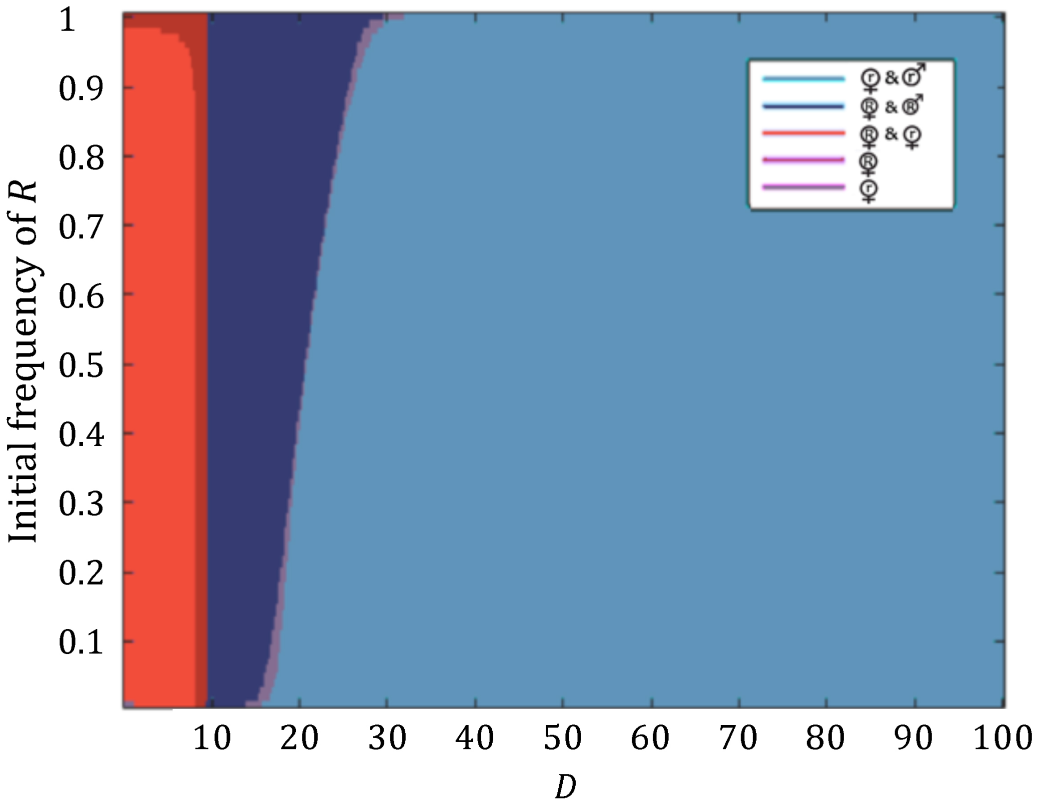

Figure S3 The influence of the initial frequency of the *R* allele on the composition of the population at evolutionary equilibrium as indicated by the colour. Where the colour changes when following a vertical line (e.g. at D = 20), the outcome is dependent on the initial frequency, whereas uniform colour along any vertical line (e.g. D = 50) indicates a single outcome regardless of the initial frequency. Other parameters: $\theta = 5$, α=0.01, β = 1.

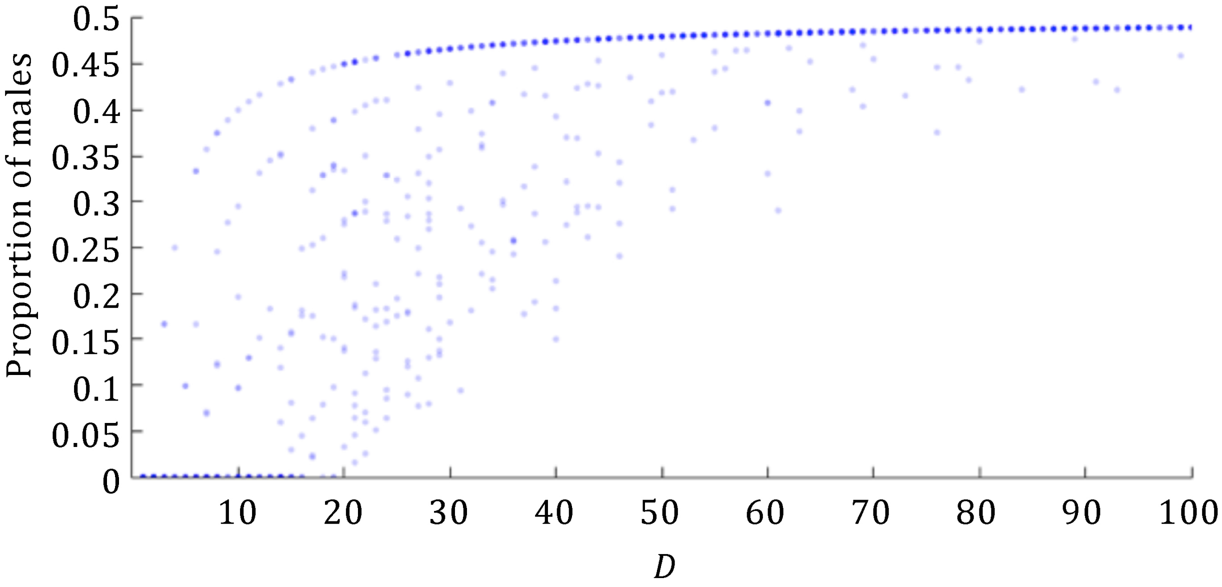

Figure S4 The evolved sex ratio at the end of 1000 generations based on simulating 10000 different uniformly distributed random parameter values, where θ was varied between 1 and 10, α between 0 and 0.01, the initial frequency of R between 0.001 and 0.999, and population density (plotted on the x axis) between 1 and 100. We used the null model assumption $\beta = 1$**.** Darker coloration indicates overlapping points (the darker the colour, the more points coincide at this location, up to 98 cases for the darkest colour present in the figure).

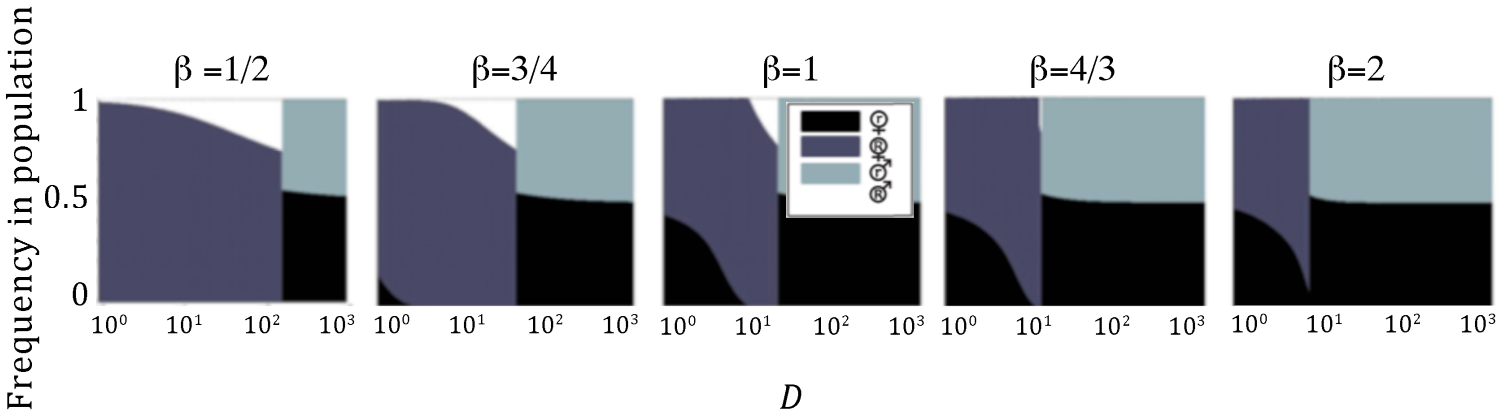

Figure S5 The influence of β (the scaling between density and mate encounter rate) on the population composition, for five values of β from $\frac{1}{2}$ to 2 as indicated. When β is low male encounter rate and population density are related in a non-linear way and both, low and high population densities resemble intermediate densities in terms of mate encounter rate. Thus prolonged mate encounters (low β) facilitate the evolution of sex in this system. Note that population density D ranges up to 10^3 and is illustrated on a logscale. Other parameters: $\theta = 5$, $\alpha = 0.01$.

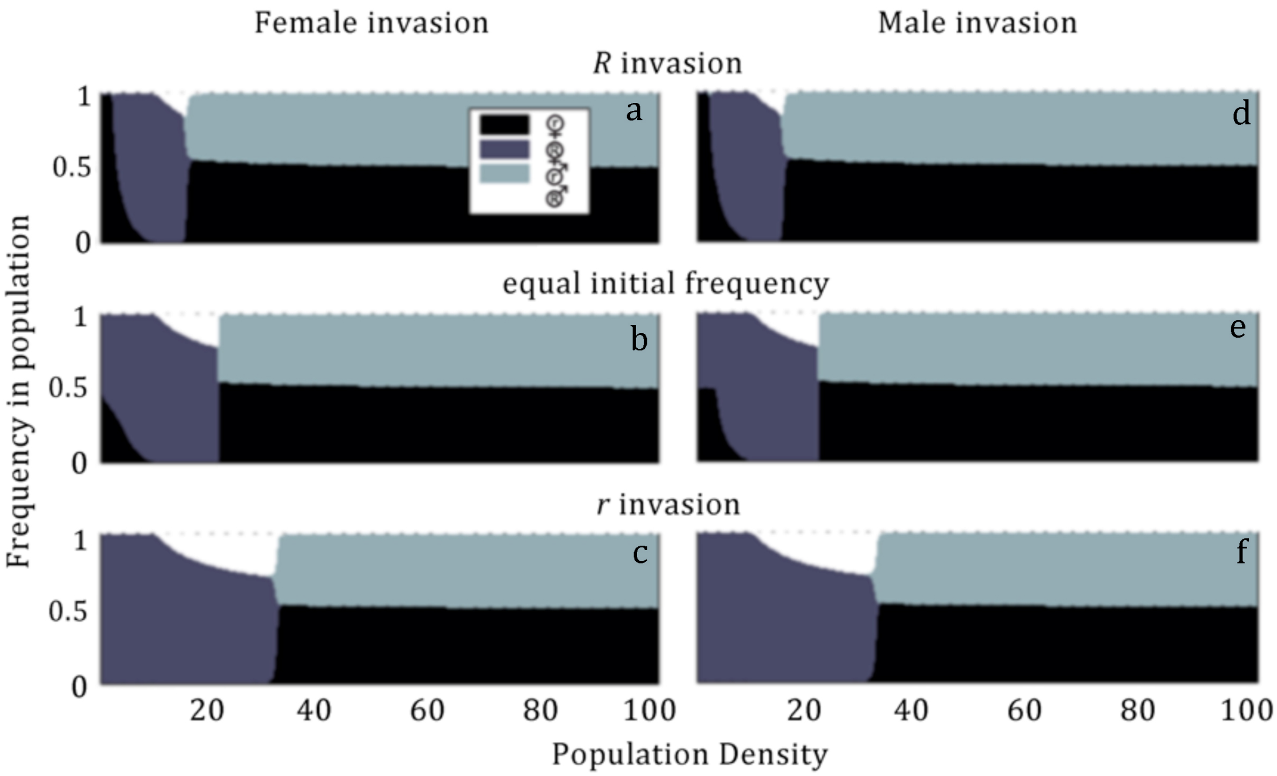

Figure S6 A comparison of the effects of initial sex ratio on the population composition as a function of population density at stable evolutionary endpoints, for an initial frequency of *R* individuals of 0.001 (a, d), equal initial frequency for both types (b, e) and for an initial frequency of *R* individuals of 0.999 (c, f). The subplots on the left (a-c) show the results for an initial high male frequency (0.999) whereas the subplots on the right (d-f) are generated with an initially low frequency of males (0.001). Other parameters: $\theta = 5$, $\alpha = 0.01$, β = 1.

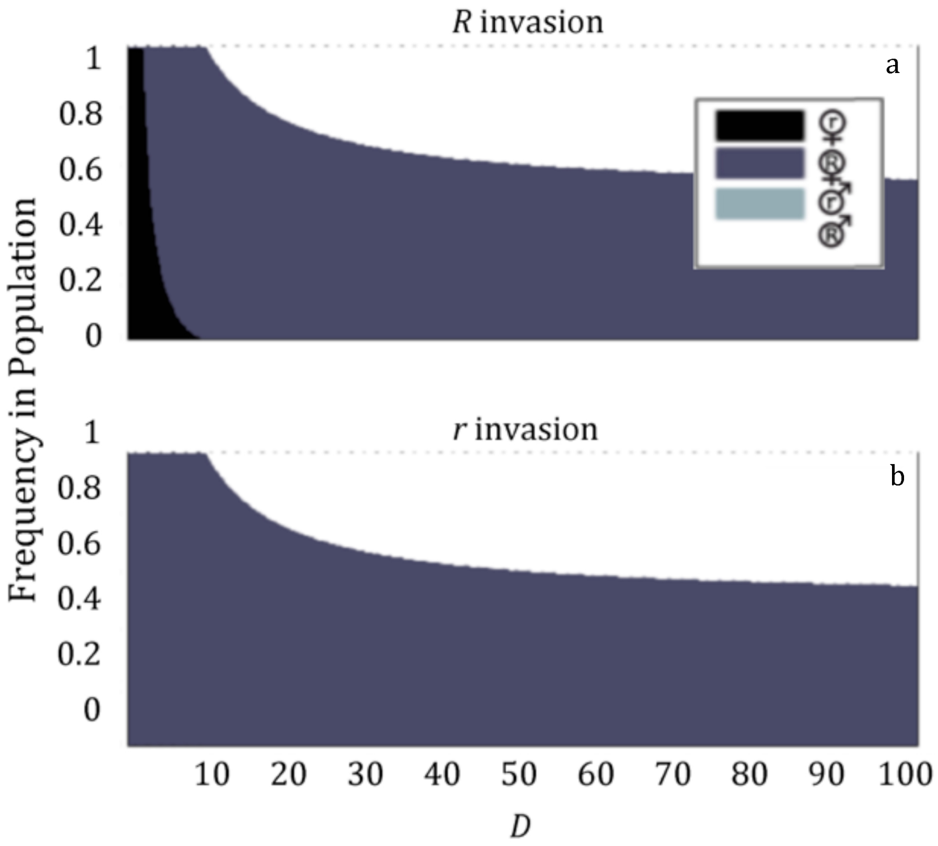

Figure S7 The population composition at evolutionary endpoints when $\alpha = 0$, which equalizes the mortalities for the two female types, (a) for an initial frequency of R individuals of 0.001, and (b) for an initial frequency of R individuals of 0.999. This figure shows what happens, when cost of resistance disappear. As soon as males can persist in the population, resistance pays off and becomes fixed. The non-resistant type can only persist at densities where males go extinct. Other parameters: $\theta = 5$, $\alpha = 0$, $\beta = 1$.

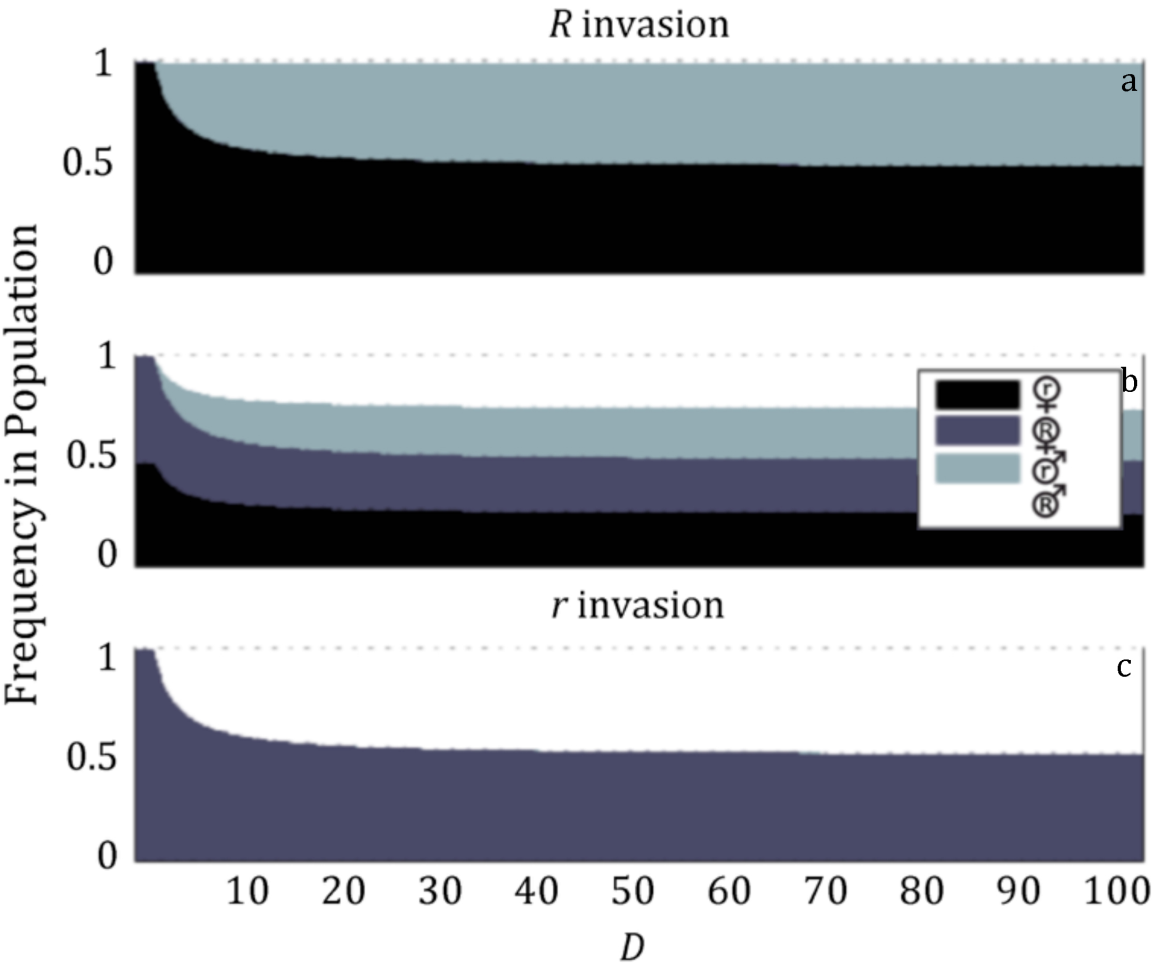

Figure S8 The evolutionarily stable composition of the population for the special case α = 0 and $\theta = 1$. Frequencies of r and R males and females as a function of population density at stable evolutionary endpoints, (a) for an initial frequency of R individuals of 0.001 and (b) for an initial frequency of R individuals of 0.999. Here, matings do not involve any sexual harassment, and the genotypes only differ in the initial frequency. Without female resistance males go extinct at very low population density due to 'self-extinguishing' male demography. Other parameters: $\theta = 1$, $\alpha = 0$, β = 1.