K	Carrying capacity	25000
c_D	Probability of gene conversion by a drive	0.9
c_B	Probability of gene conversion by a brake	0.8
$N_{0D}^{(0)}$	Initial number of introduced drive-WT individuals	1000
$N_{0B}^{(0)}$	Initial number of introduced brake-WT individuals	100
$t_{\max}$	Maximum time of the simulations	2500

Table S1: Fixed parameters

f_I	Frequency of the drive allele in the population when the brake is introduced	$\{0.025, 0.1375, 0.25, 0.375, 0.5, 0.625, 0.75, 0.8625, 0.975\}$
$h_{D0} = h_{B0} = h_{DB} = h$	Dominance parameter	$\{0, 0.5\}$

Table S2: Varying parameters

	Scenario #	(1)	(2)	(3)	(4)	(5)	(6)
	Brake...	does not restore fitness			restores fitness		
	Effects on	d	ω	β	d	ω	β
	d_{00}	0.6	0.6	0.6	0.6	0.6	0.6
Adult death rate	d_{DD}	1.1	0.6	0.6	1.1	0.6	0.6
	d_{BB}	1.1	0.6	0.6	0.64	0.6	0.6
	ω_{00}	1.0	1.0	1.0	1.0	1.0	1.0
Juvenile survival	ω_{DD}	1.0	0.545	1.0	1.0	0.545	1.0
	ω_{BB}	1.0	0.545	1.0	1.0	0.938	1.0
	β_{00}	1.0	1.0	1.0	1.0	1.0	1.0
Adult fecundity	β_{DD}	1.0	1.0	0.738	1.0	1.0	0.738
	β_{BB}	1.0	1.0	0.738	1.0	1.0	0.968

Table S3: Parameters for the different scenarios, depending on whether the brake restores fitness (modulo a small cost) or not, and on which life-history parameter is affected (adult survival d, zygote survival ω, adult fecundity β).

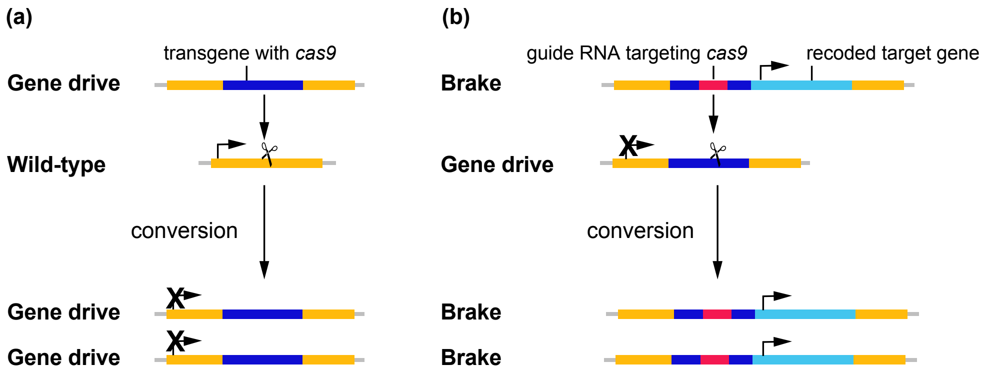

Figure S1: Gene conversions: (a) Conversion of the wild-type allele into a gene drive allele and (b) conversion of the gene drive allele into a brake allele that restores fitness. The brake construct includes a functional version (light blue) of the target gene (light orange) disrupted by the gene drive.

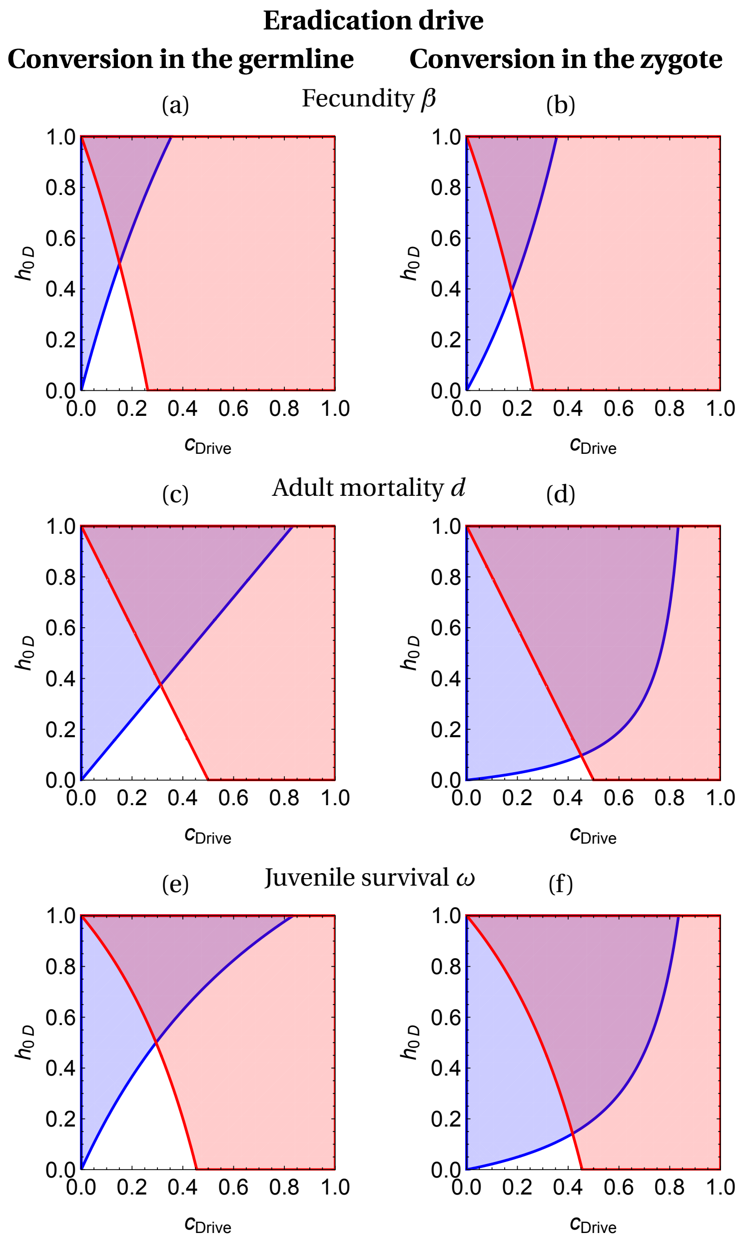

Figure S2: Local stabilities of the drive-only and the wild-type only equilibria in the absence of brake, for an eradication drive. The wild-type only equilibrium is locally stable in the blue-shaded region left of the blue curve; the drive-only equilibrium is locally stable in the red-shaded region right of the red curve. Neither equilibrium is locally stable in the white area, in which the two alleles coexist. Both equilibria are locally stable in the purple area; the final outcome depends on the initial conditions (bistability). Drives whose parameters put them in the purple area are threshold-dependent. Parameters are listed in Tables S1–S3.

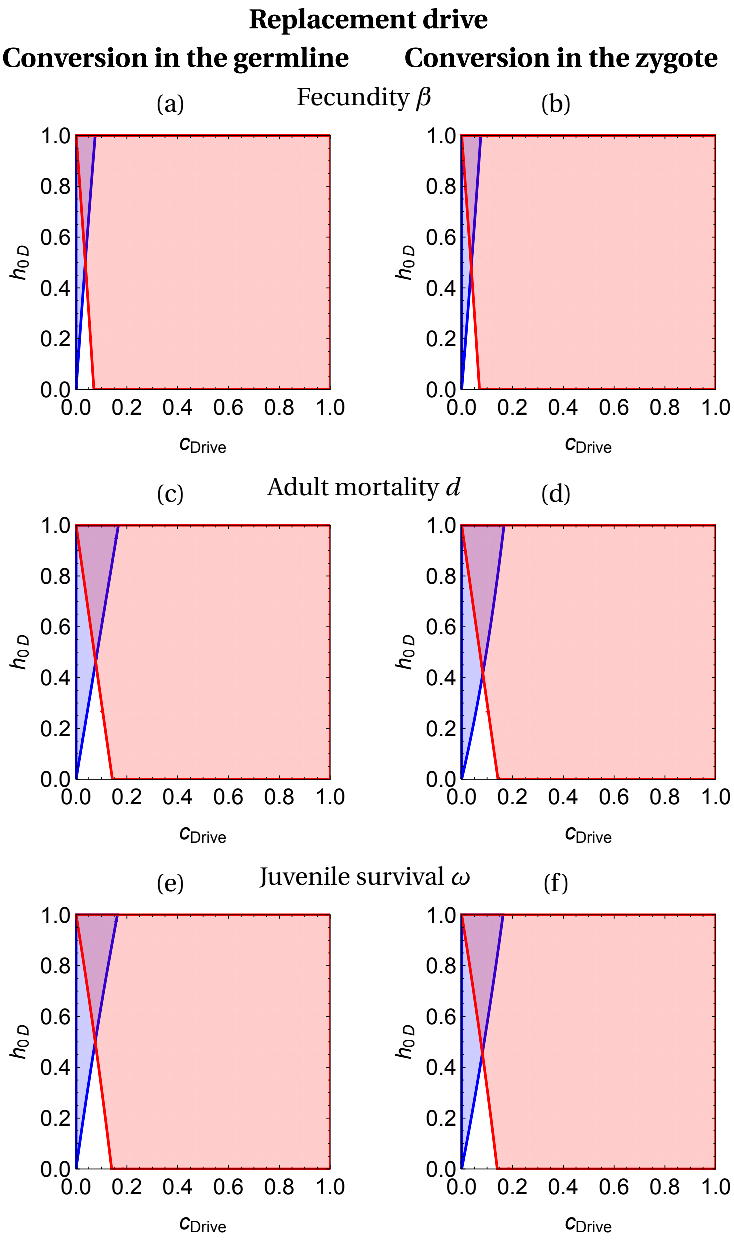

Figure S3: Local stabilities of the drive-only and the wild-type only equilibria in the absence of brake, for a replacement drive. The legend is the same as figure S2.

Conversion in the germline, brake restores fitness

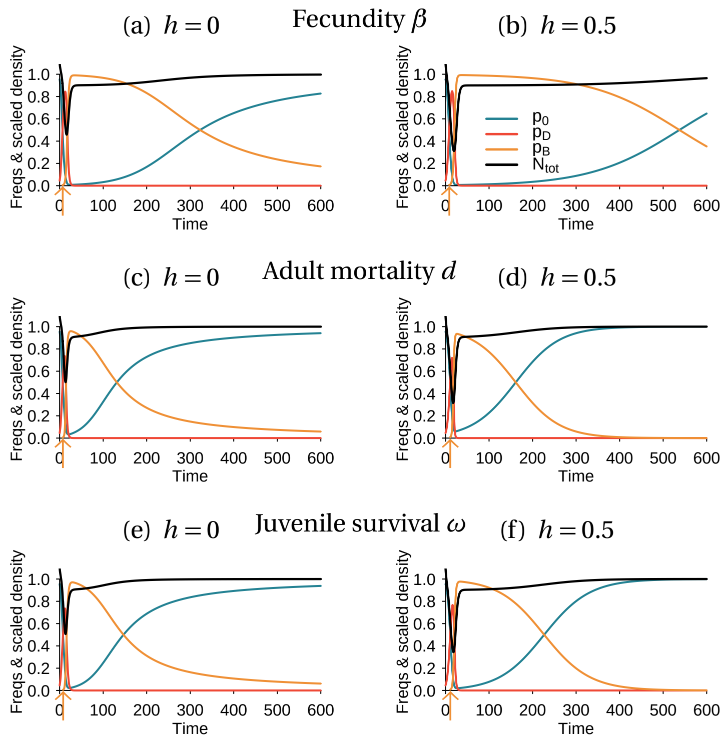

Figure S4: Deterministic dynamics of the frequencies of each allele in the population, and scaled total population size (black curve). Conversion takes place in the germline, and the brake restores fitness. See figure 2 for details.

Conversion in the zygote, brake does not restore fitness

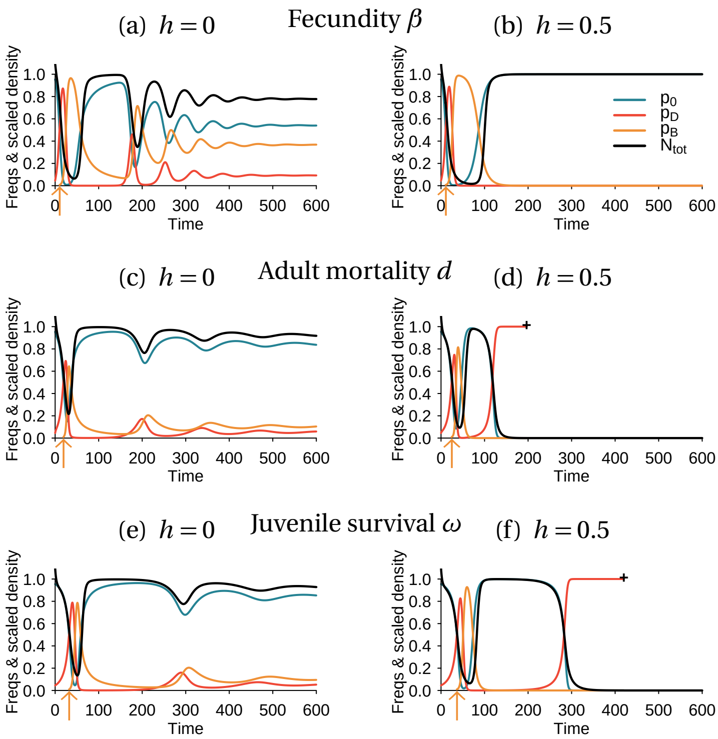

Figure S5: Deterministic dynamics of the frequencies of each allele in the population, and scaled total population size (black curve). Conversion takes place in the zygote, and the brake does not restore fitness. See figure 2 for details.

Conversion in the zygote, brake restores fitness

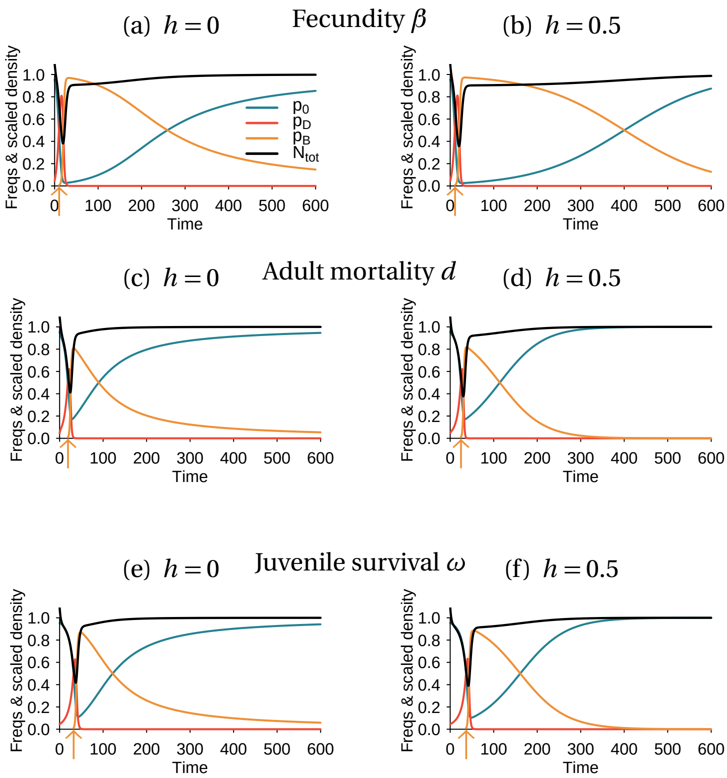

Figure S6: Deterministic dynamics of the frequencies of each allele in the population, and scaled total population size (black curve). Conversion takes place in the zygote, and the brake restores fitness. See figure 2 for details.

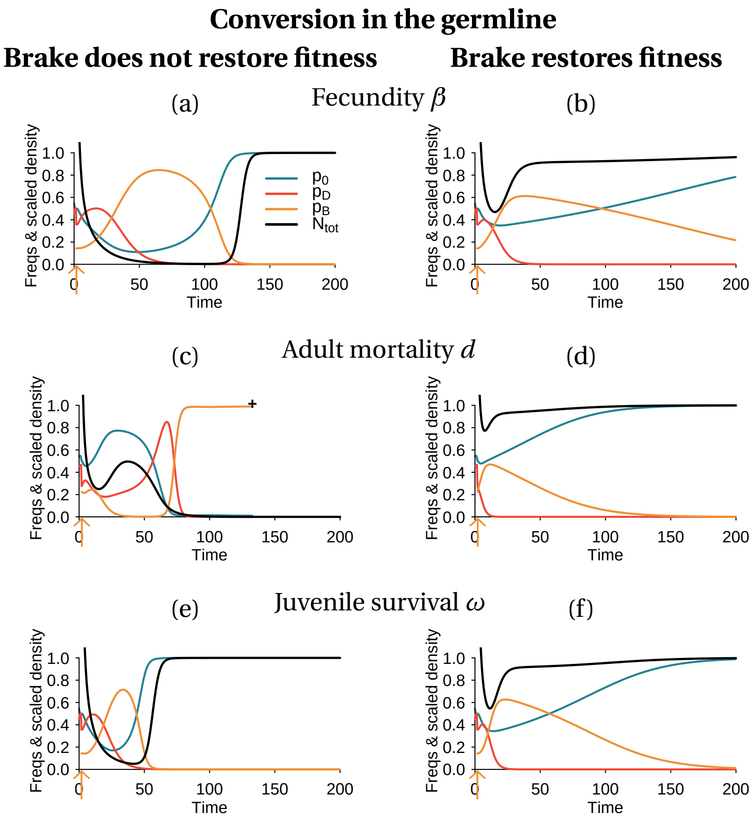

Figure S7: Deterministic dynamics when the drive is threshold-dependent; conversion takes place in the germline. Parameters are the same as in the other figures, except for the dominance parameter ($h = 1$) and for conversion efficiencies ($c_\mathrm{D} = 0.3$, $c_\mathrm{B} = 0.25$ in panels (a)–(b);$c_\mathrm{D} = 0.6$, $c_\mathrm{B} = 0.55$ in panels (c)–(d); $c_\mathrm{D} = 0.5$, $c_\mathrm{B} = 0.45$ in panels (e)–(f)). Introduction densities are $N_{0\mathrm{D}} = 10^5$ and $N_{0\mathrm{B}} = 10^4$.

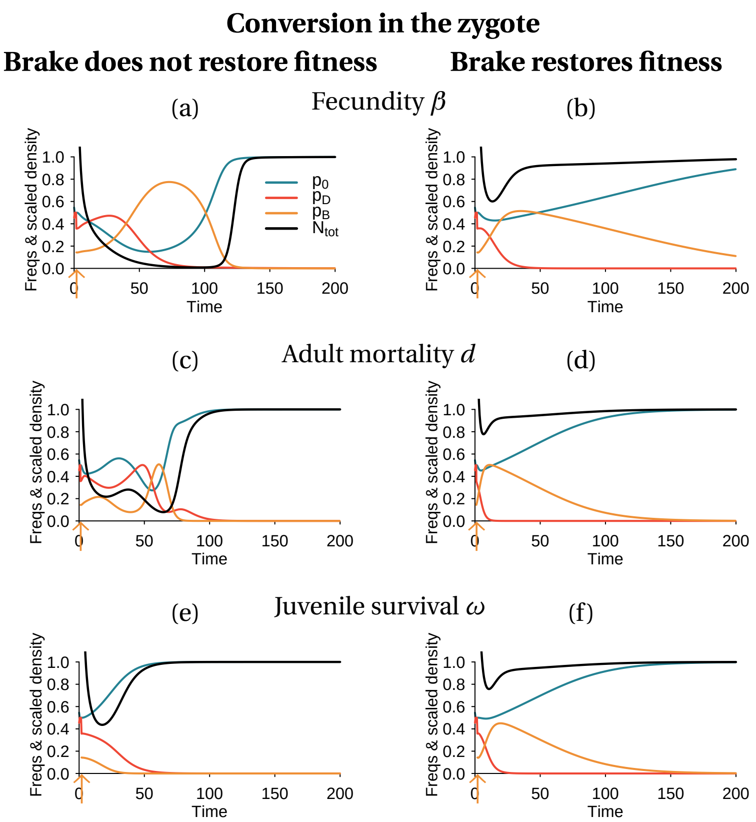

Figure S8: Deterministic dynamics when the drive is threshold-dependent; conversion takes place in the zygote. See figure S7 for parameter values.