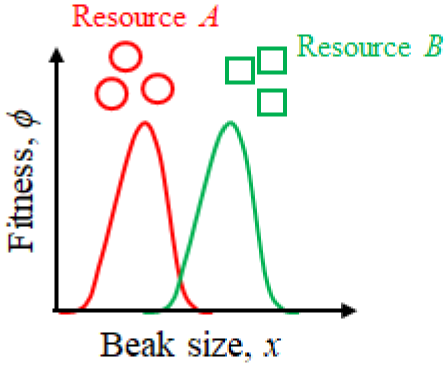
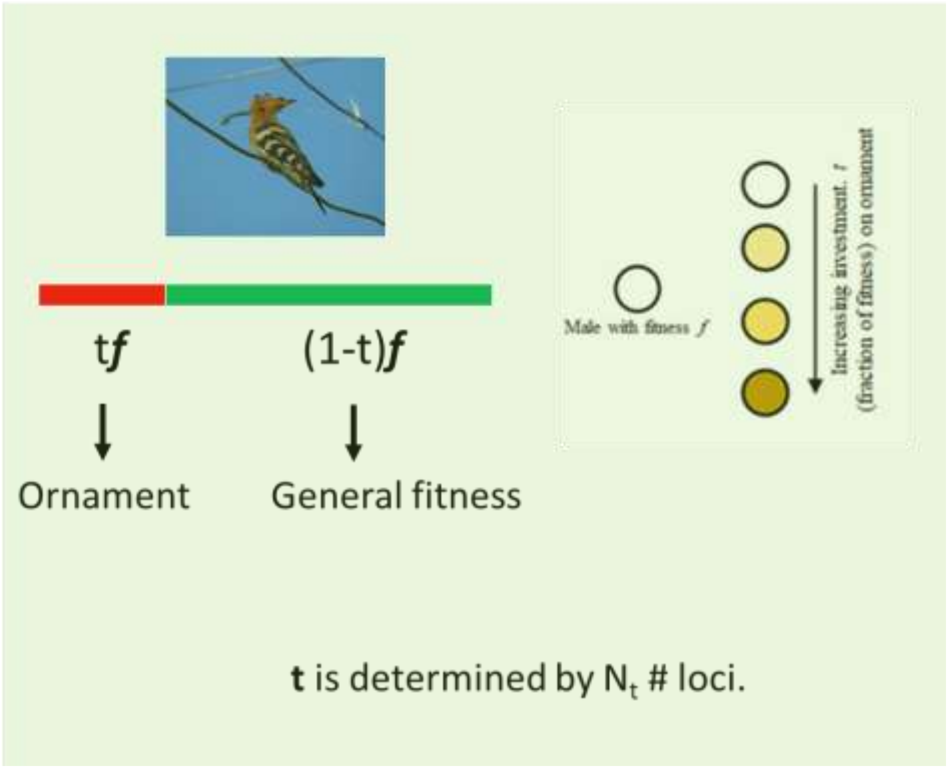
Modelling sympatric speciation in a bird population



Disruptive selection at the population level

For a male with fitness $\boldsymbol{f}$



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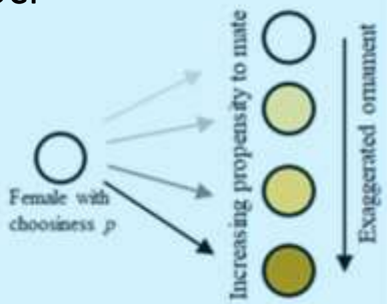
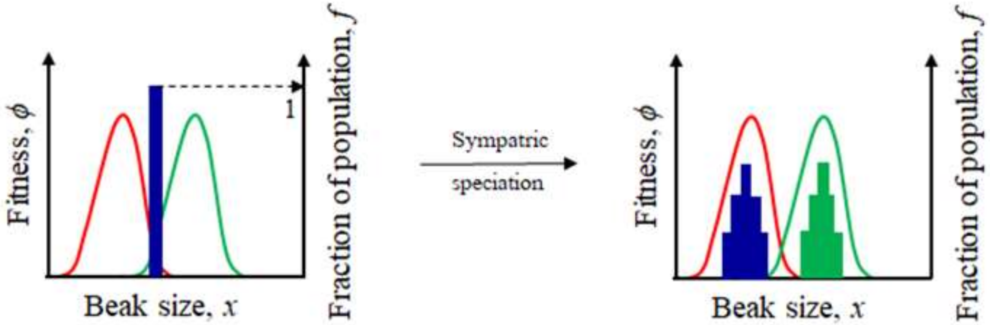
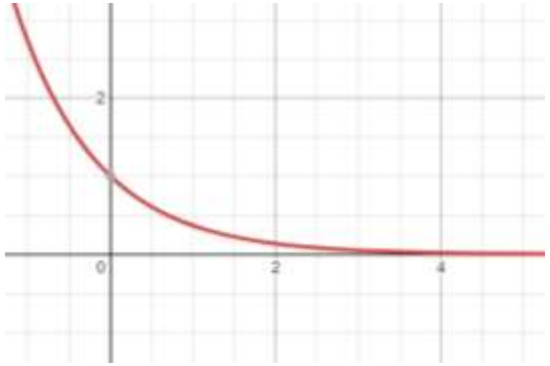
A female with fitness ***f***

Choosiness is ‘p’ and is determined by N_p # of loci

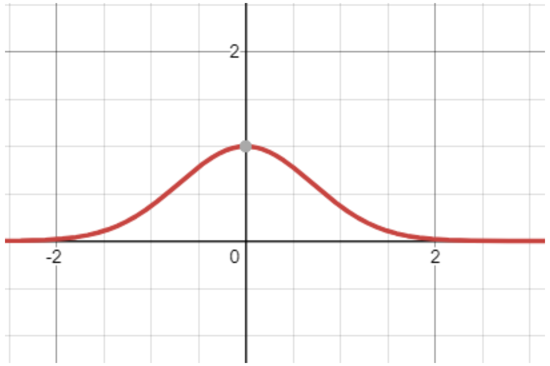




Investment and choosiness have associated costs.

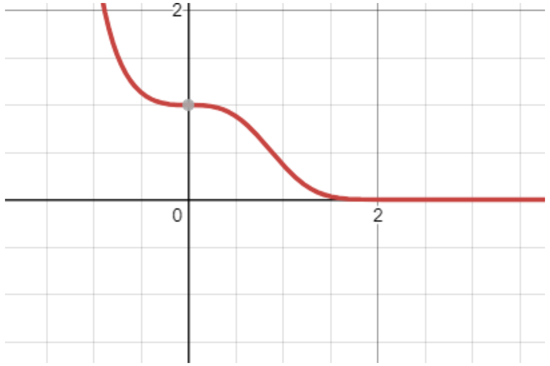


exp(-x)



exp(-x²)

Most suitable



exp(-x³)

Female finding a partner α $\exp(-ap^2)$
Male survival α $\exp(-bt^2)$

Probability of i^{th} female mating with j^{th} male α $\exp(\alpha p_i t_j q_j)$,
where 'α' is the strength of sexual selection

Genetics of the starting population

Females:

N_x=20, Δx=0.05

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

N_p=20, Δp=0.001

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

N_t=20, Δt=0.005

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

Males:

N_x=20, Δx=0.05

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

N_t=20, Δt=0.005

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

N_p=20, Δp=0.001

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

Assumptions in the model

- No dominance
- No epistasis
- No linkage
- No sex-linked traits
- No mutation
- Recombination does not give rise to new alleles.