The effect of directional gene flow on moving sex chromosomal clines

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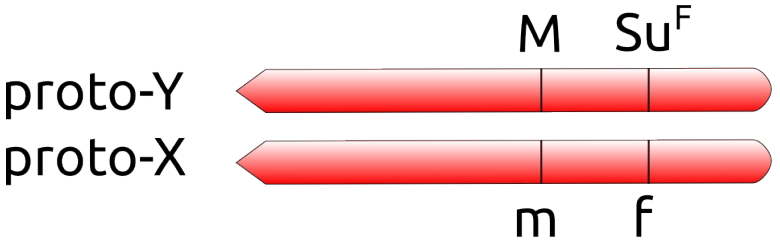
Sex chromosome evolution – Theory

- Sex-determining loci and
- Acquisition of sexually antagonistic alleles

  → facilitate cessation of recombination
- Loss of recombination leads to degeneration



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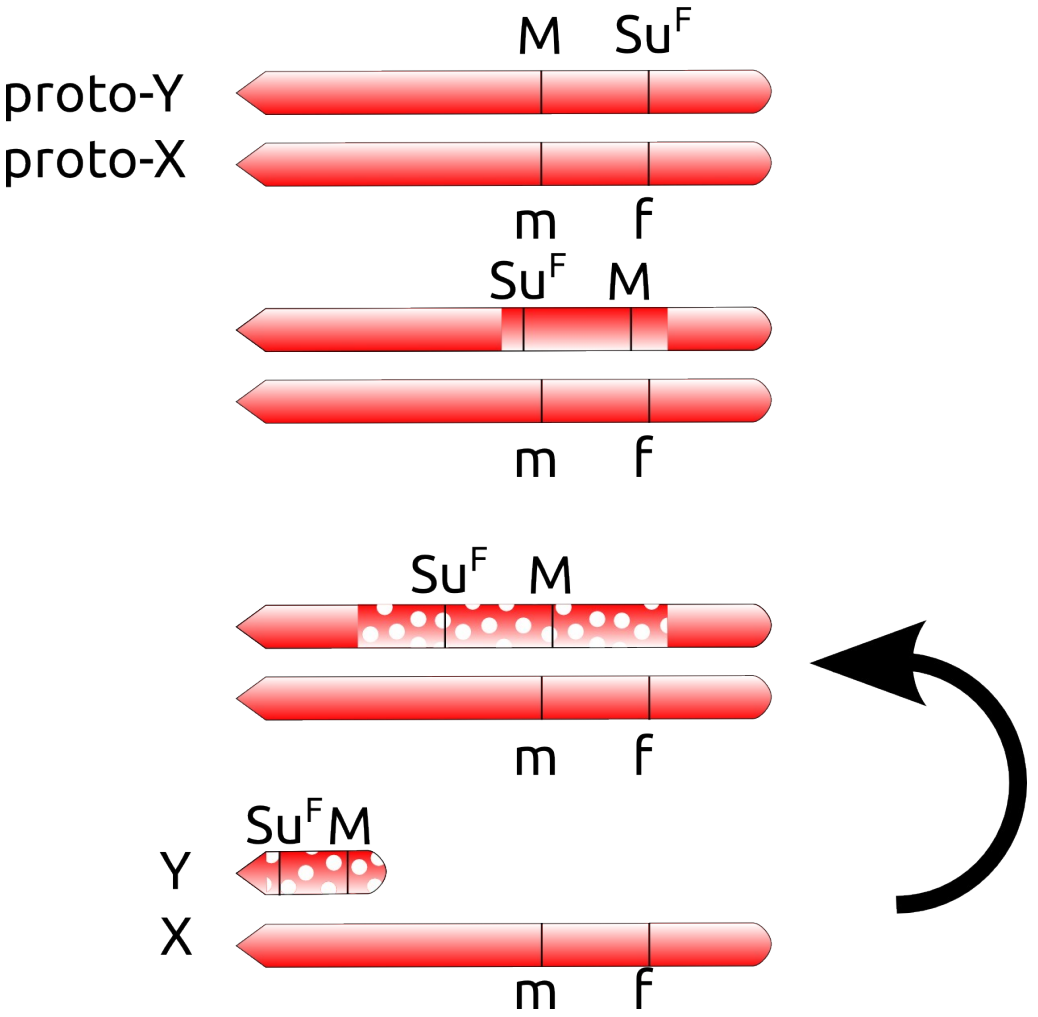

How to test?

- Study of incipient sex chromosomes
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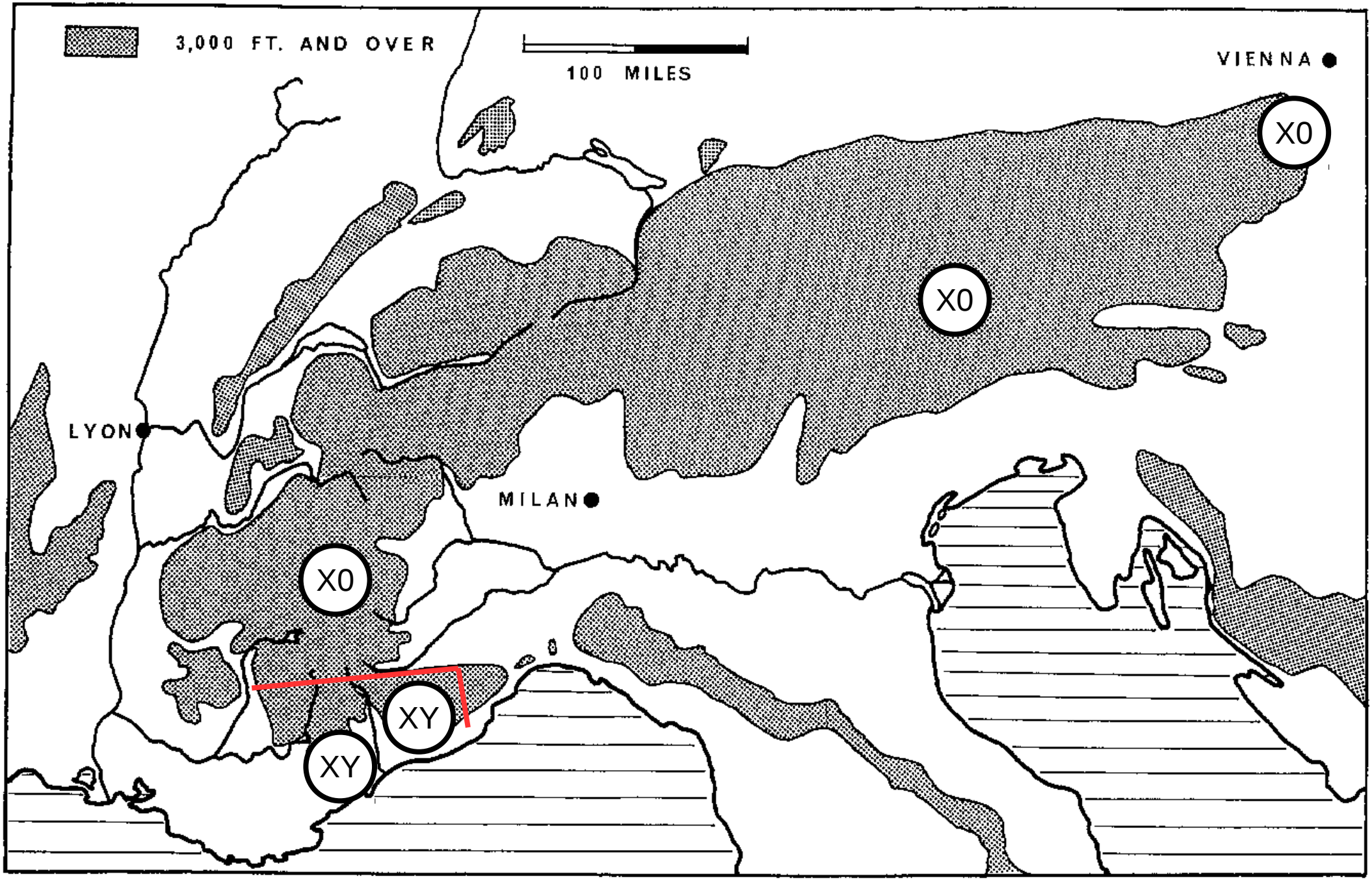
Podisma pedestris

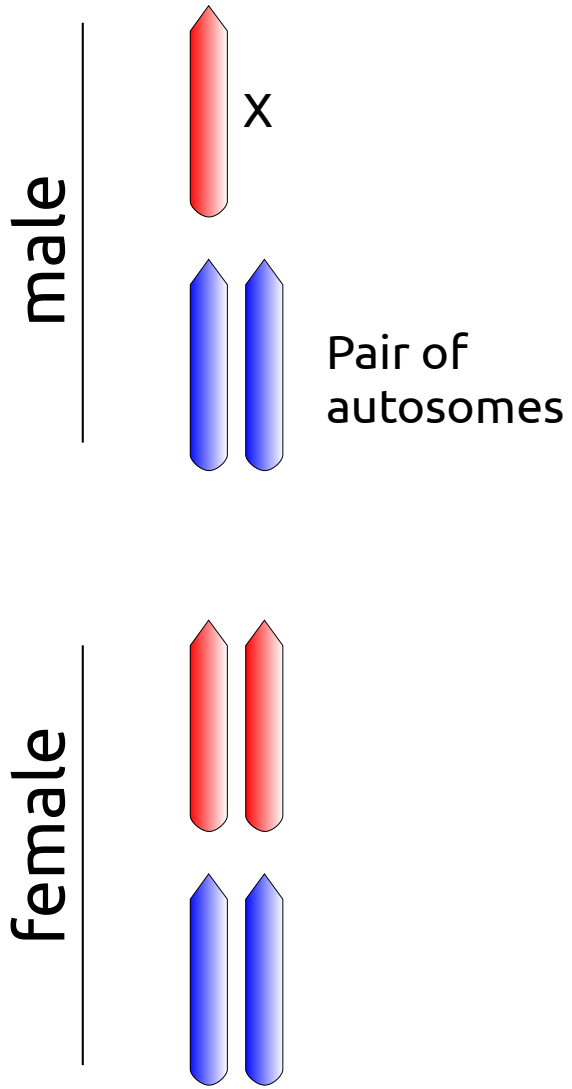
- Neo-X/neo-Y system
- Originated from X0/XX
- Hybrid zone

Photo: Martin Garlovsky



John, B. and Hewitt, G.M. (1970) *Chromosoma*, **31**, 291–308. (modified)

Evolution of a neo-X/neo-Y sex chromosome system



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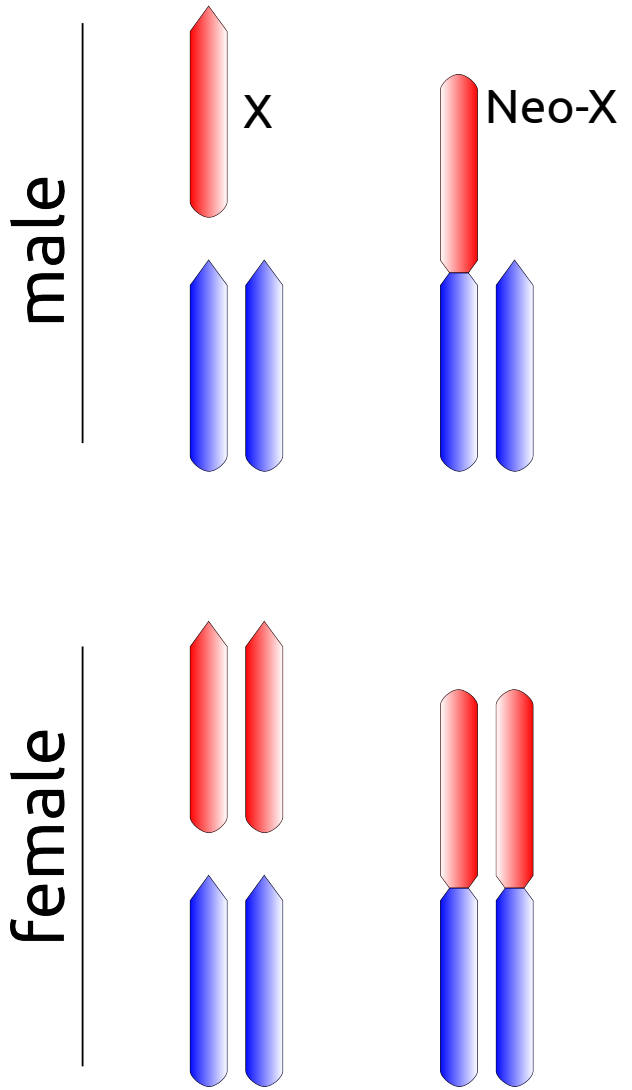

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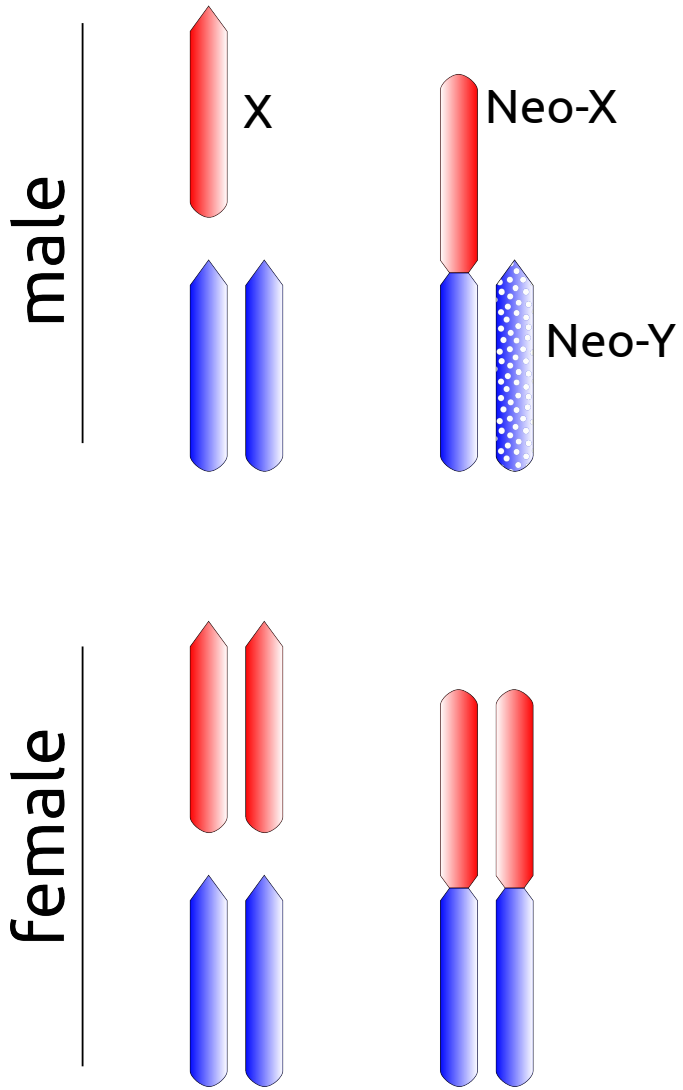
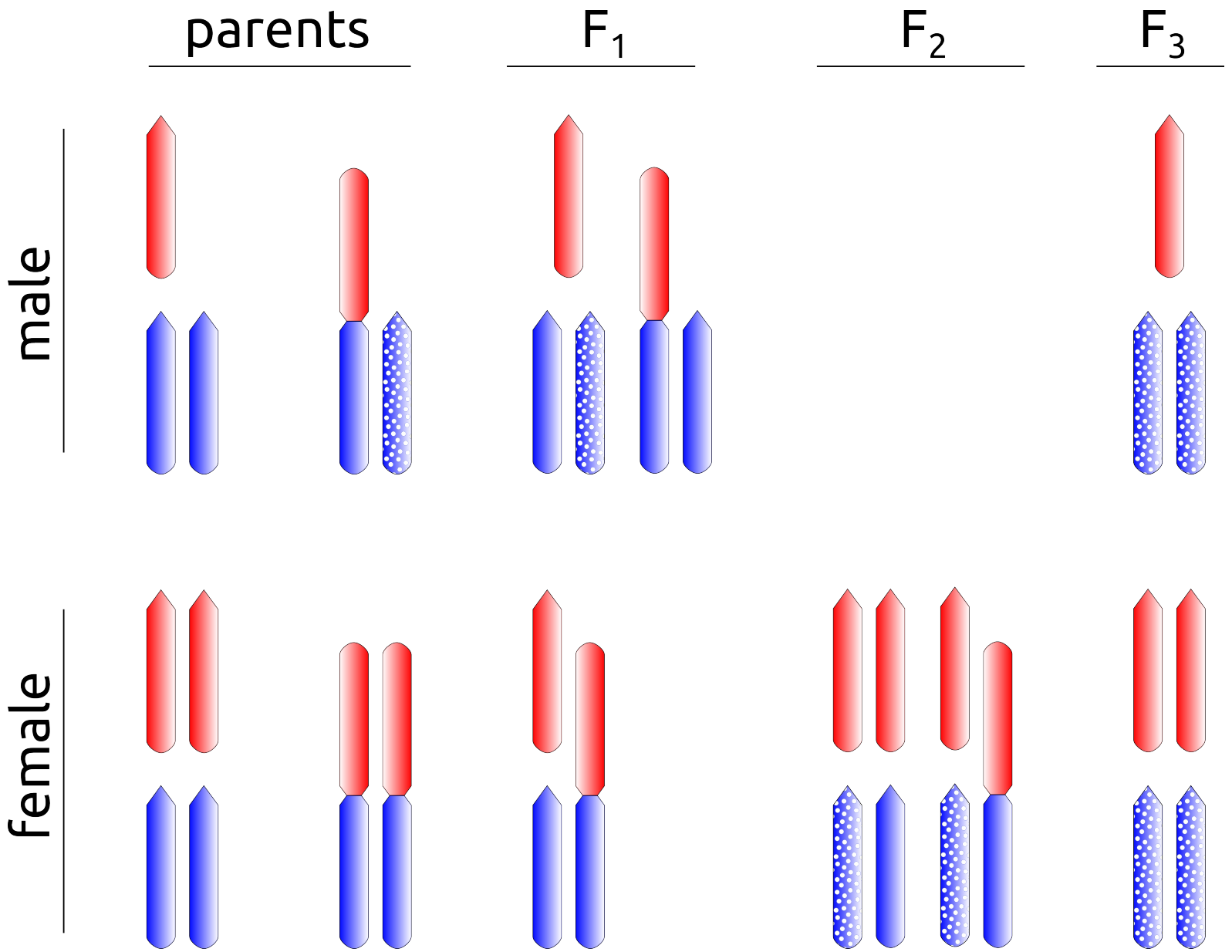
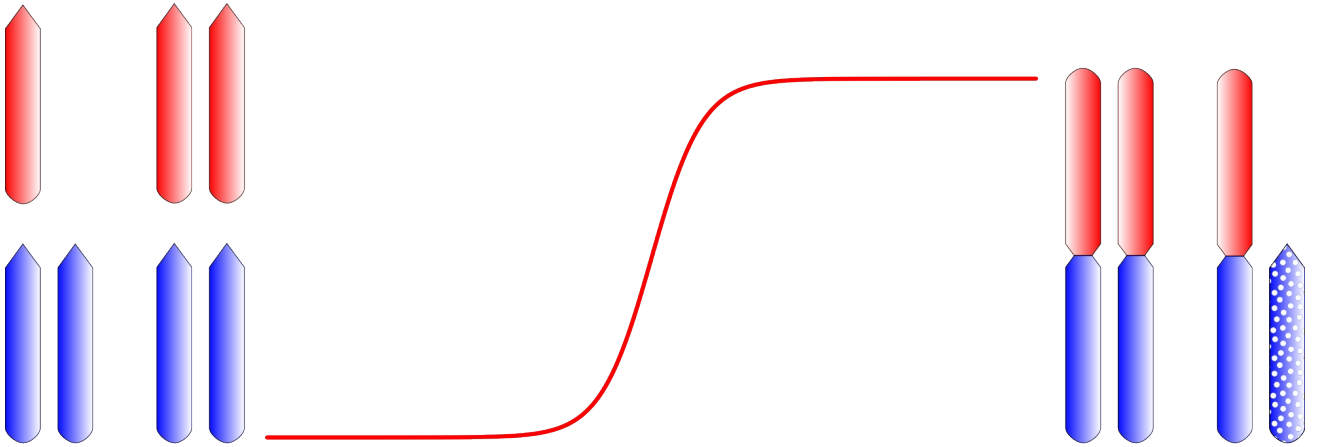


Hybrid genotypes



Chromosomal distributions



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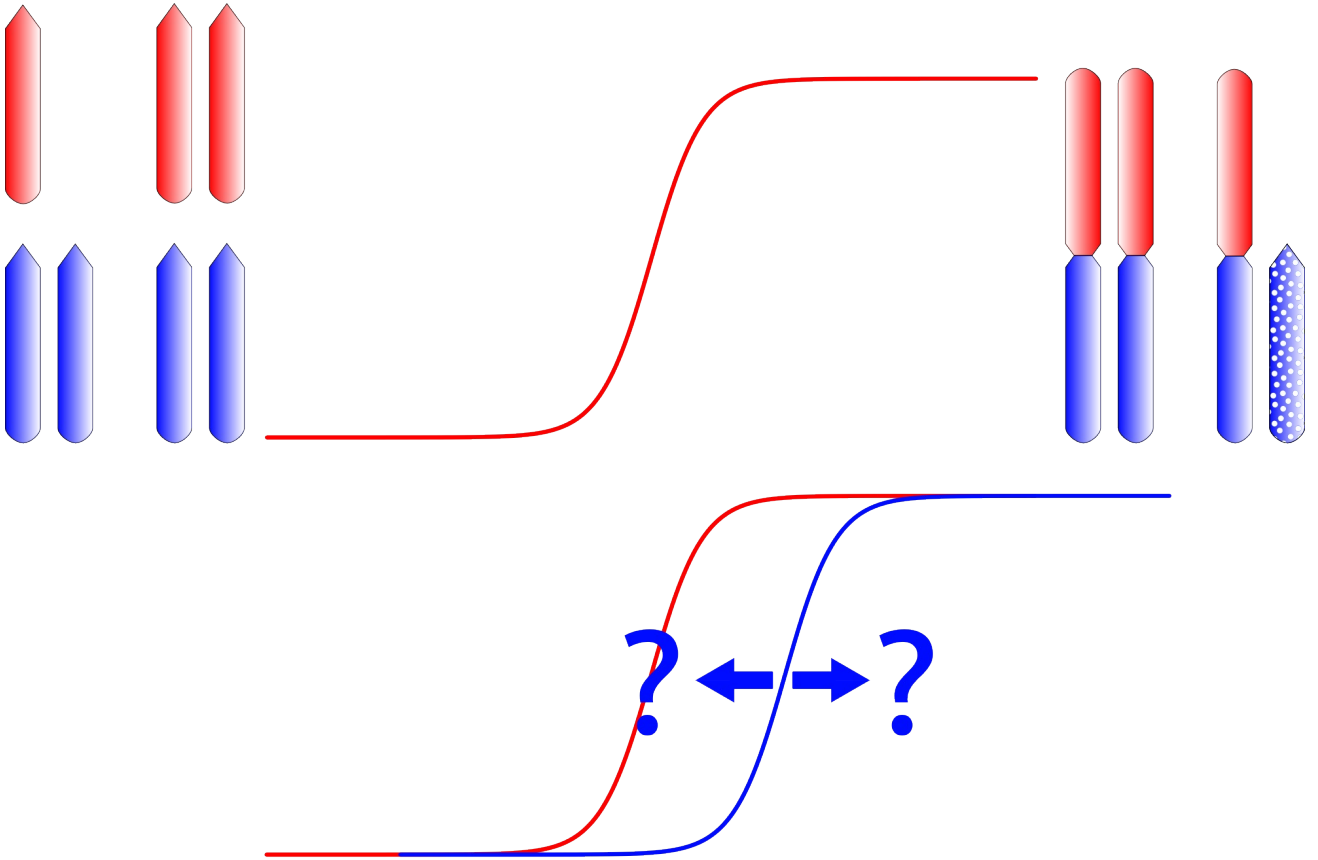

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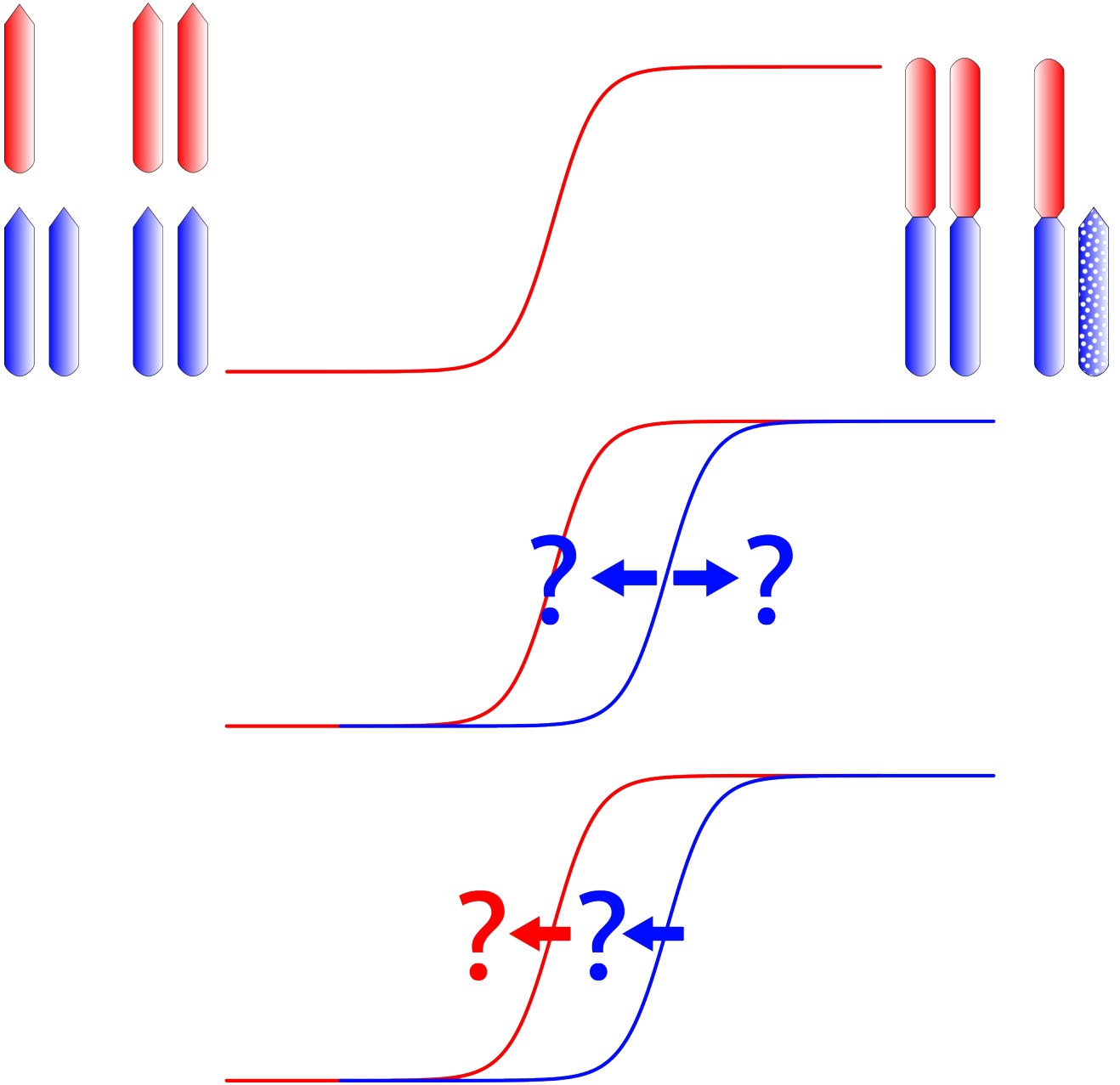
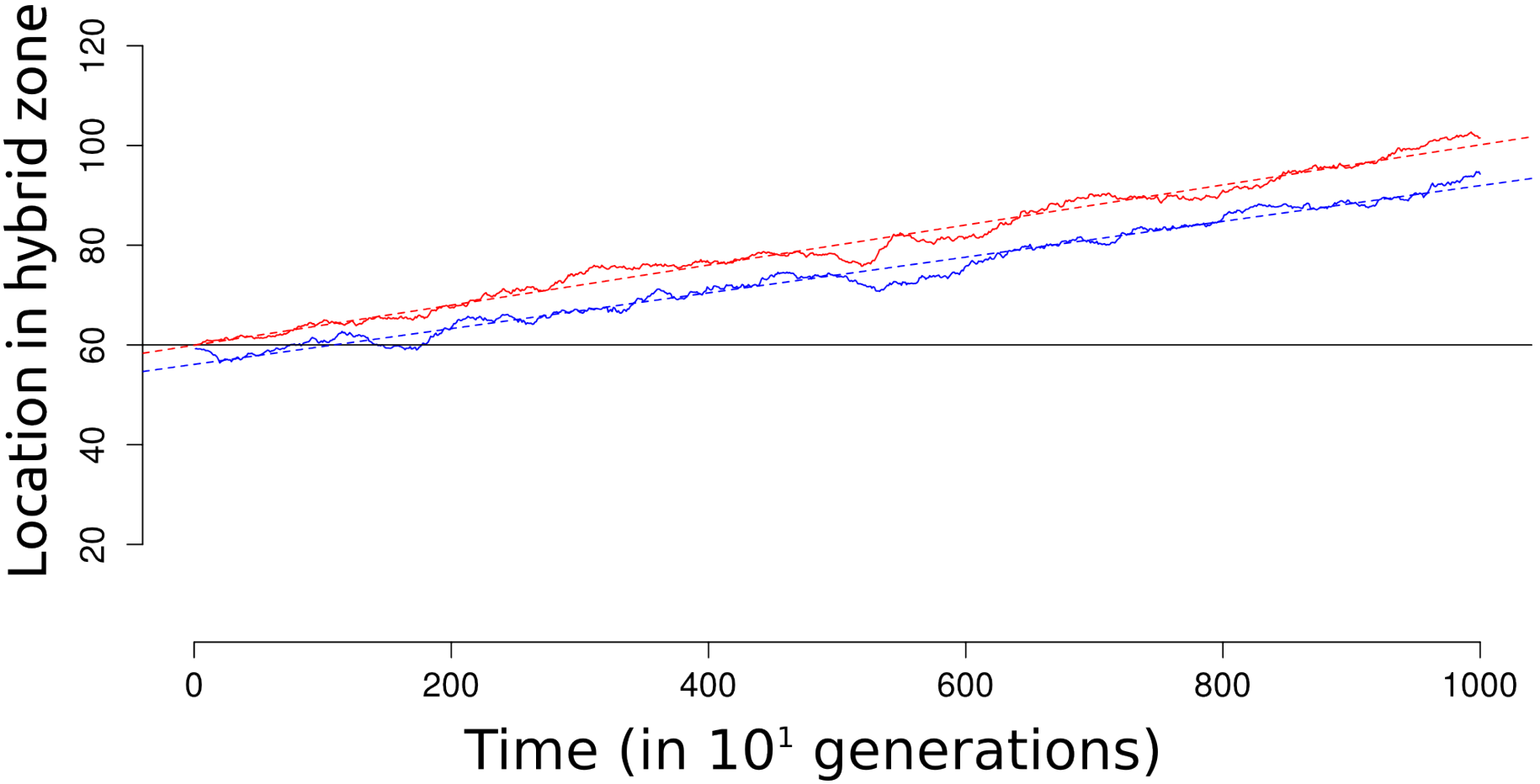
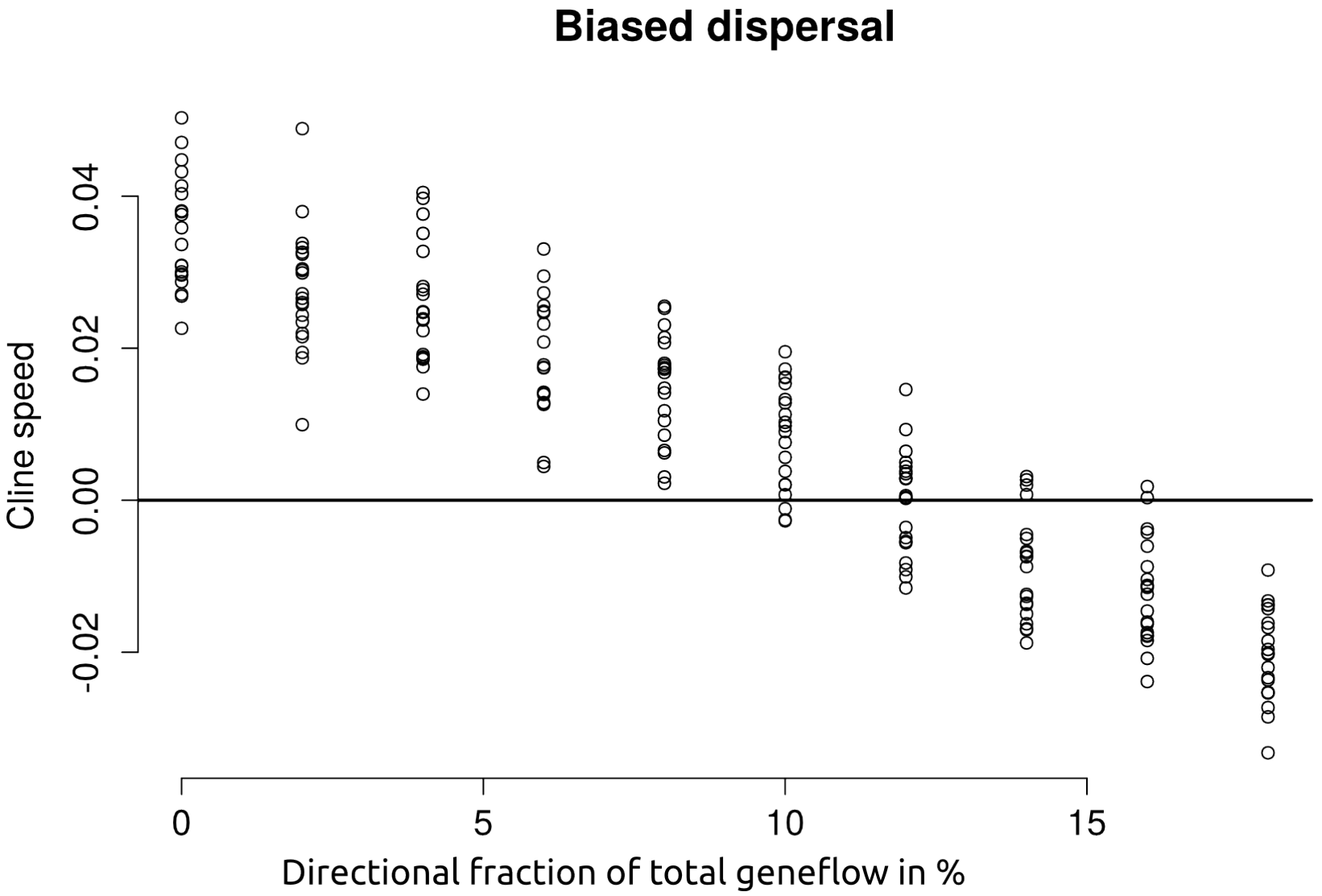


Moving clines



Directional gene flow



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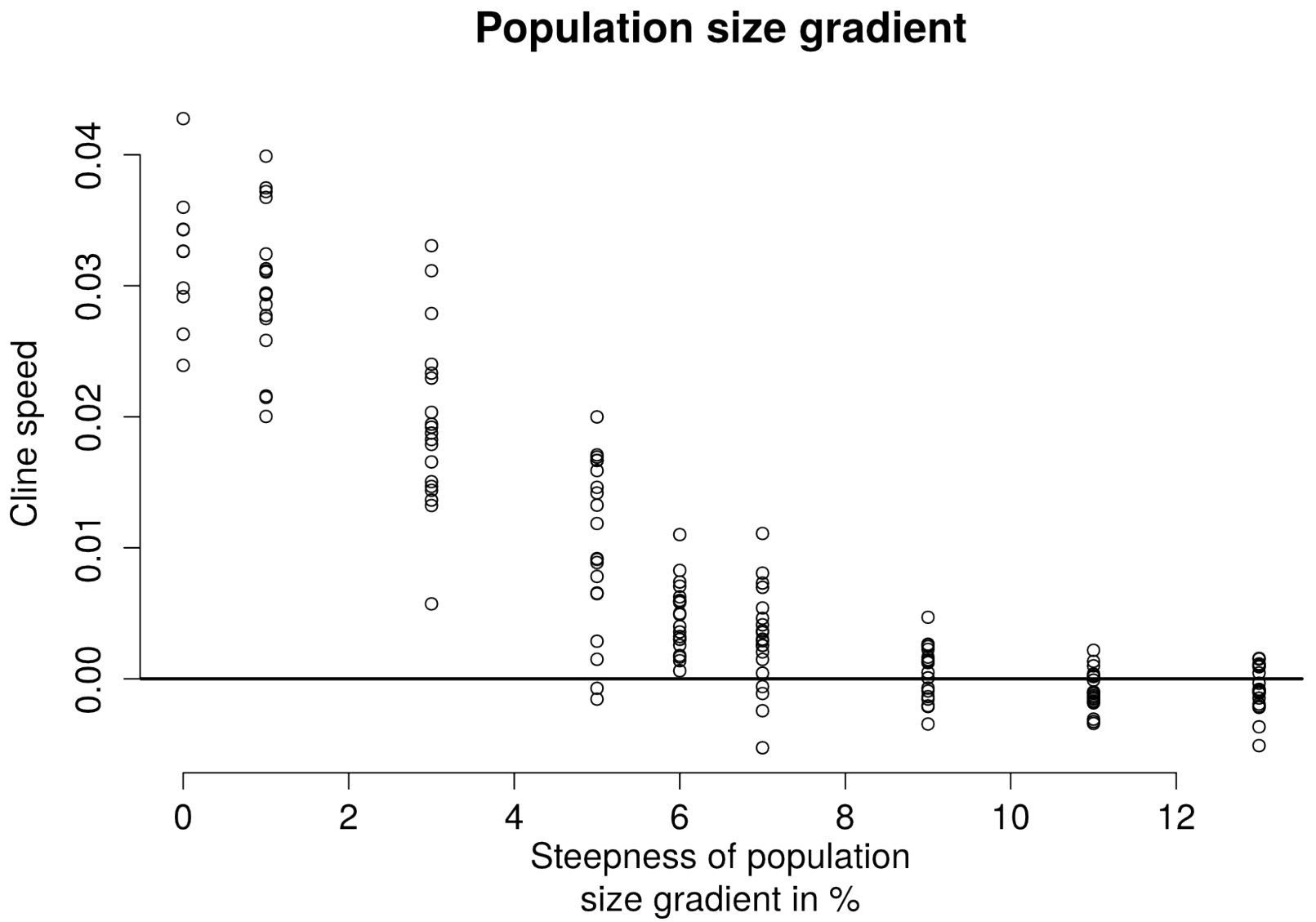

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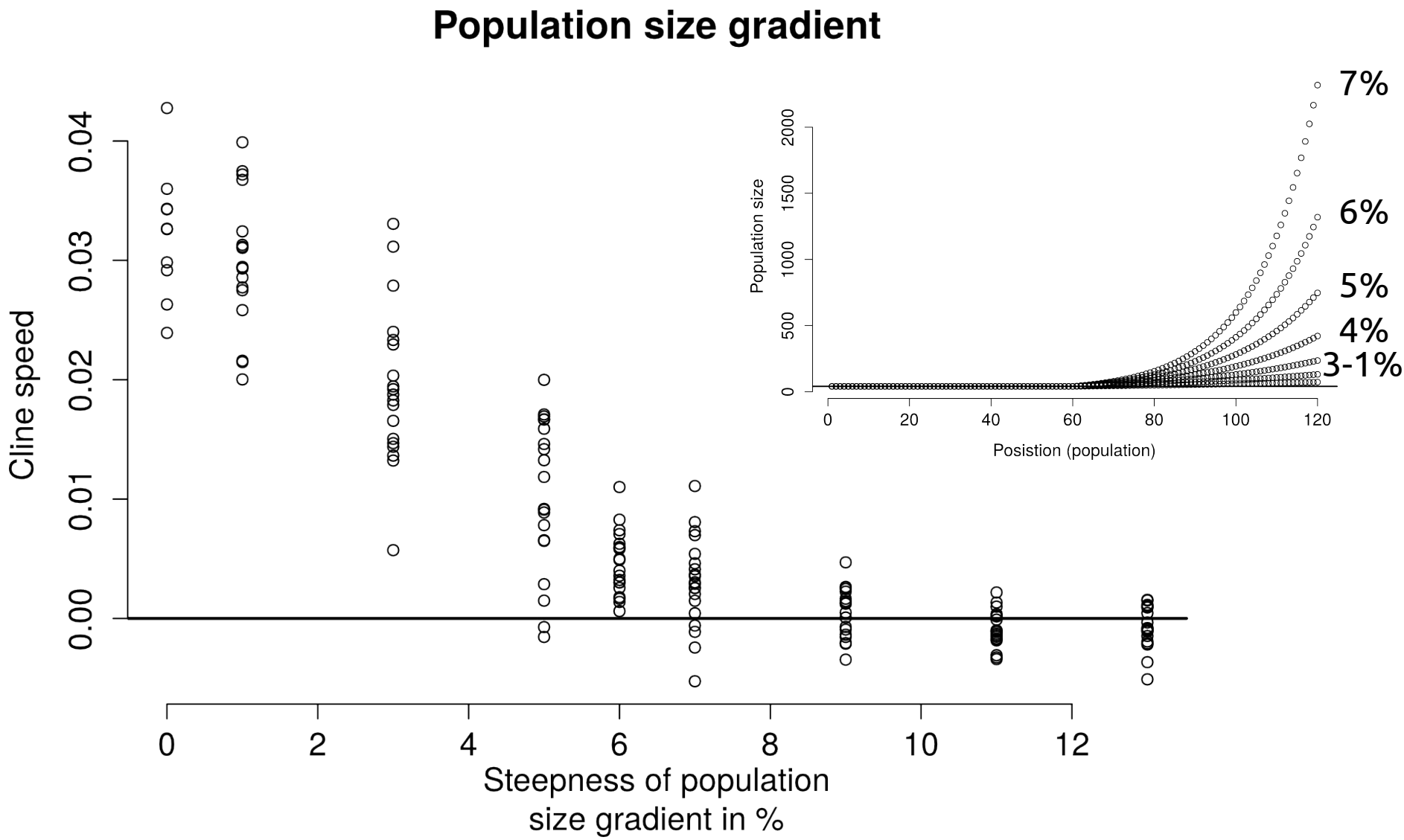

Cline movement due to sexually antagonistic alleles

- ...is likely to occur.
- ...but can be easily superseded by directional gene flow as found in natural habitats.

- ...is no comprehensive explanation for the *Podisma* races' distribution.
- ...may still have a net influence.

https://hannesbecher.github.io