

SELECÇÃO

Modelos de selecção

Seleccção positiva

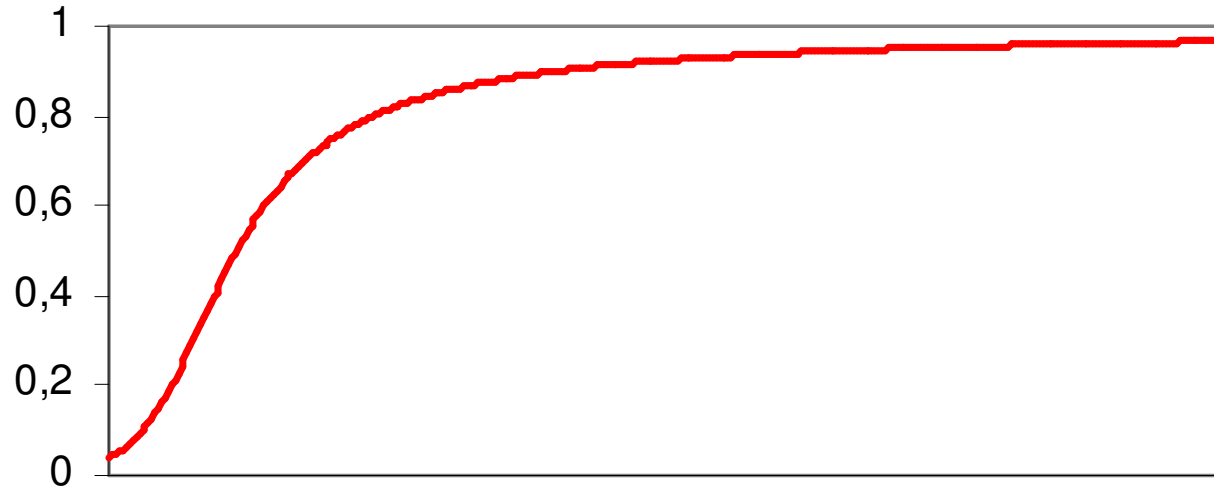
- Qual é a evolução da frequência de um alelo que tenha uma probabilidade de ser escolhido em cada geração superior à de outro(s) alelos?

- **AA** **Aa** aa
- p^2 $2pq$ q^2 (nascença)=1
- p^2 $2pq$ q^2 (1-**s**) (idade reprodutiva)= $q^2 - q^2$ **s**



-
- **$p_{t+1} = p_t / (1 - q_t^2 s)$** (geração seguinte)

Seleccção positiva (dominância)



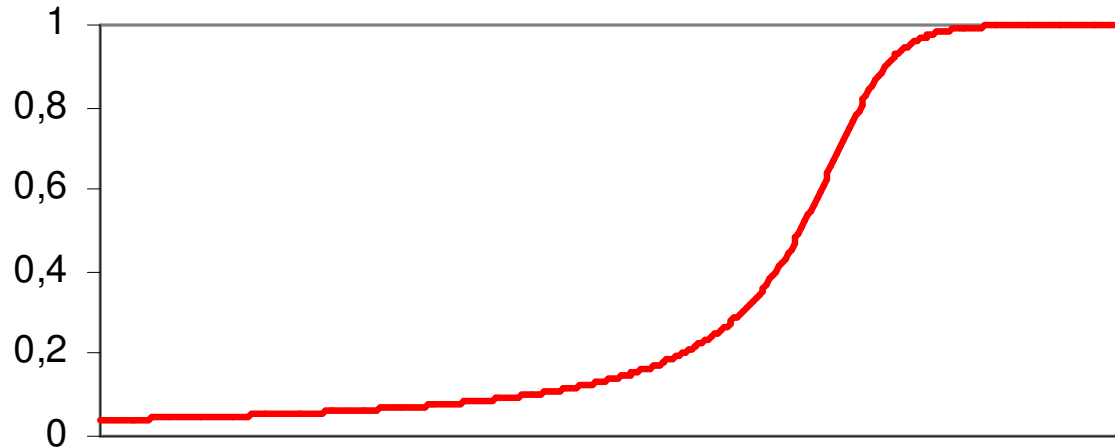
AA; $W = 1$

Aa; $W = 1$

aa; $W = 0,9 = 1 - s$; $s = 0,10$

$p_0 = 0,04$

Seleccção positiva (recessividade)



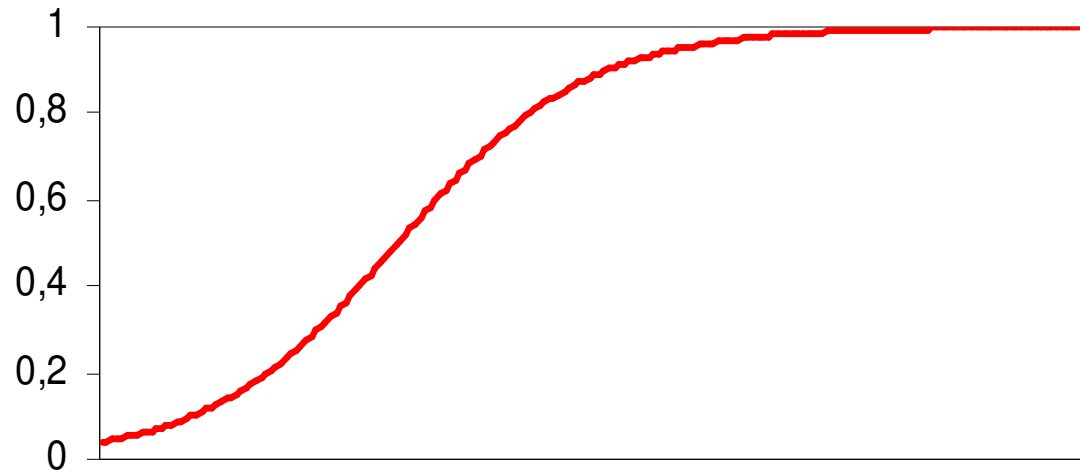
aa; $W = 1$

Aa; $W = 0,90 = 1 - s$; $s = 0,10$

AA; $W = 0,9 = 1 - s$; $s = 0,10$

$p_0 = 0,04$

Seleccção positiva (aditividade)



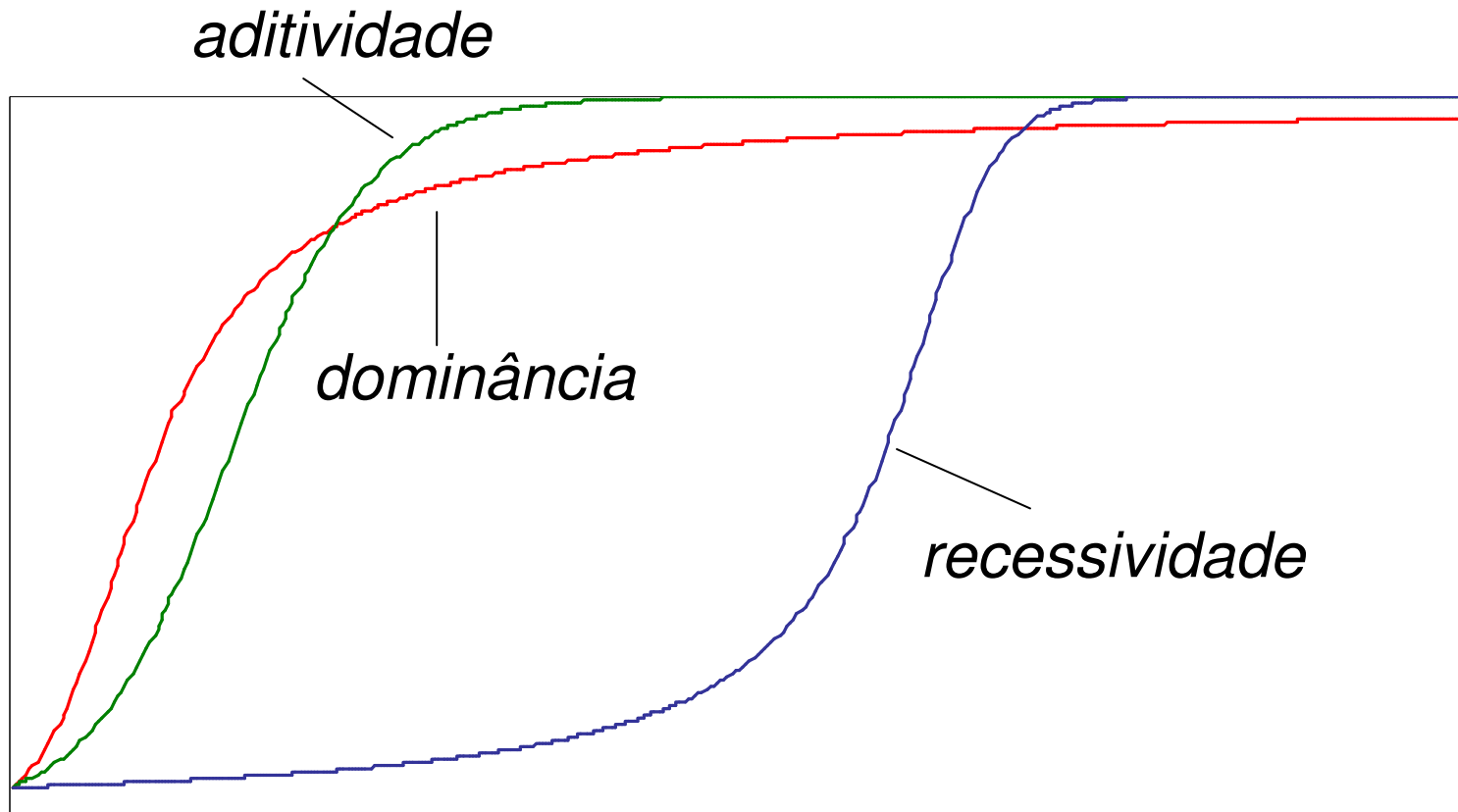
AA; $W = 1$

Aa; $W = 0,95 = 1 - hs$; $s = 0,10$, $h = 0,5$

aa; $W = 0,9 = 1 - s$; $s = 0,10$

$p_0 = 0,04$

Seleção positiva



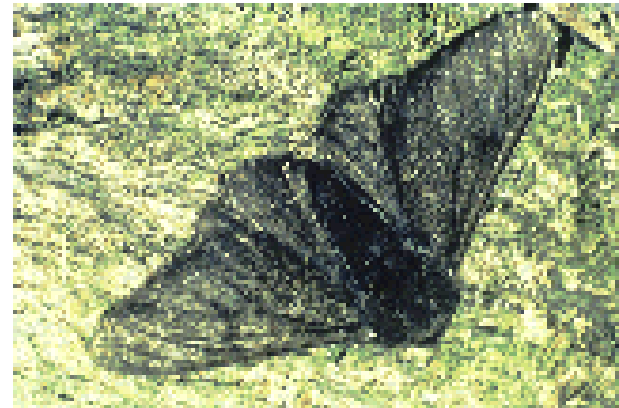
Seleccção em *Biston betularia*



dd



Dd
DD



Seleção em *Biston betularia*

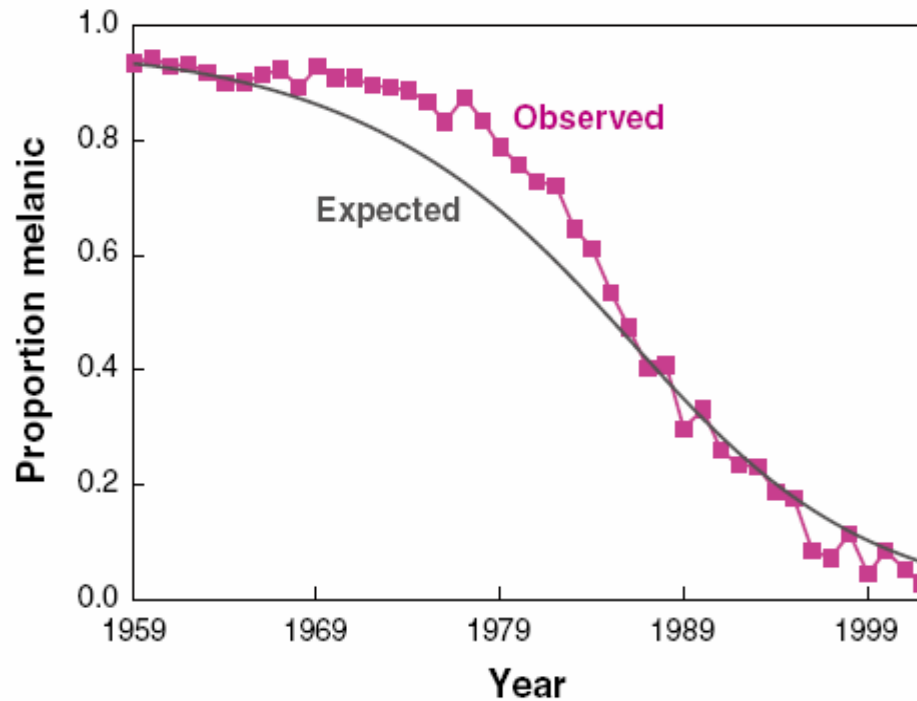


Figure 1

The observed decline in the frequency of melanics from 1959 to 2002 at Caldy Common in England (*magenta squares*) (Grant 2005) and the expected decline when there is 15.3% selection against the melanics (*dark gray line*).

Seleção em *Chaetodipus intermedius*

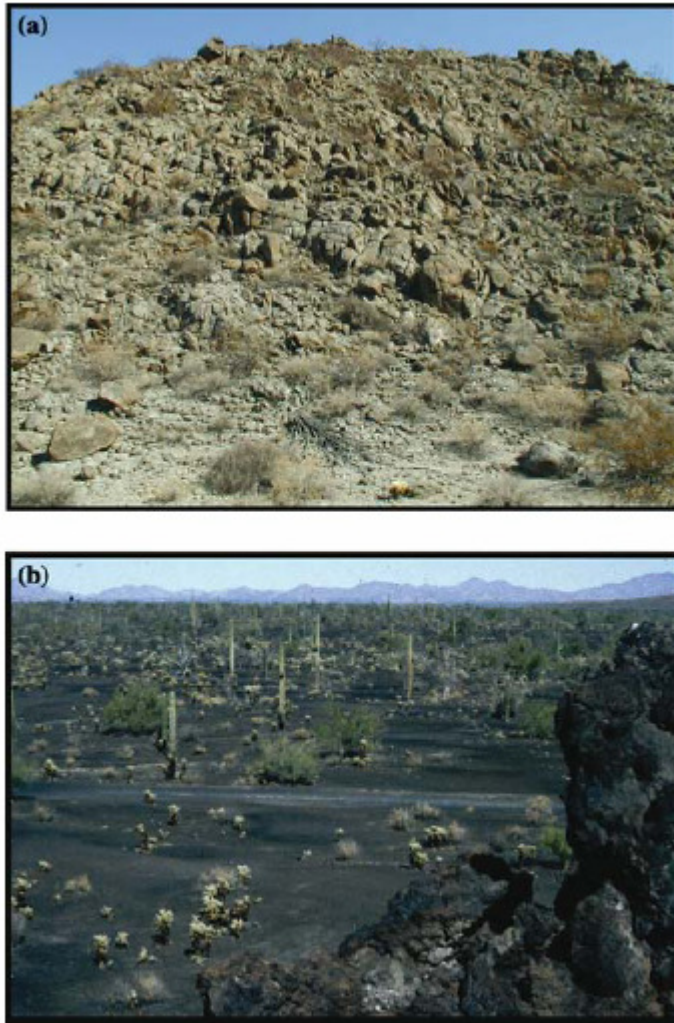


Figure 1. Typical habitats for *C. intermedius* showing light rocks (a) and dark lava (b).

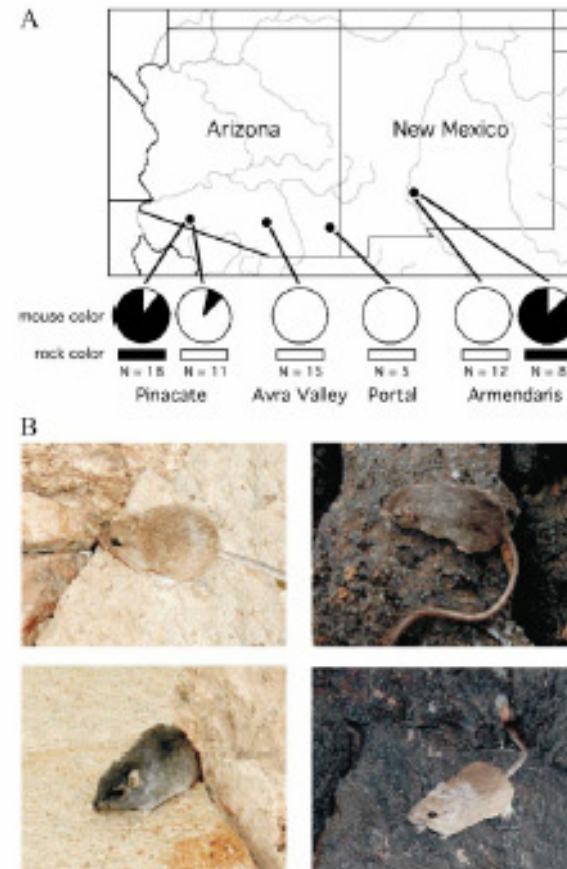


Fig. 1. (A) Collecting localities, substrate color, and mouse color. Sample sizes at each site are given. Pie charts indicate the proportion of light and dark mice at each site. Rectangles indicate the substrate color at each site. Mice from Pinacate and Armendaris were sampled on dark lava and also on light rock adjacent to the lava, whereas mice from Avra Valley and Portal were sampled only on light rock. (B) Light and dark *C. intermedius* from the Pinacate locality on light and dark rocks.

Genetica 123: 125-136 (2005)

Proc Natl Acad Sci 100: 5268-5273 (2003)

Seleção em *Chaetodipus intermedius*

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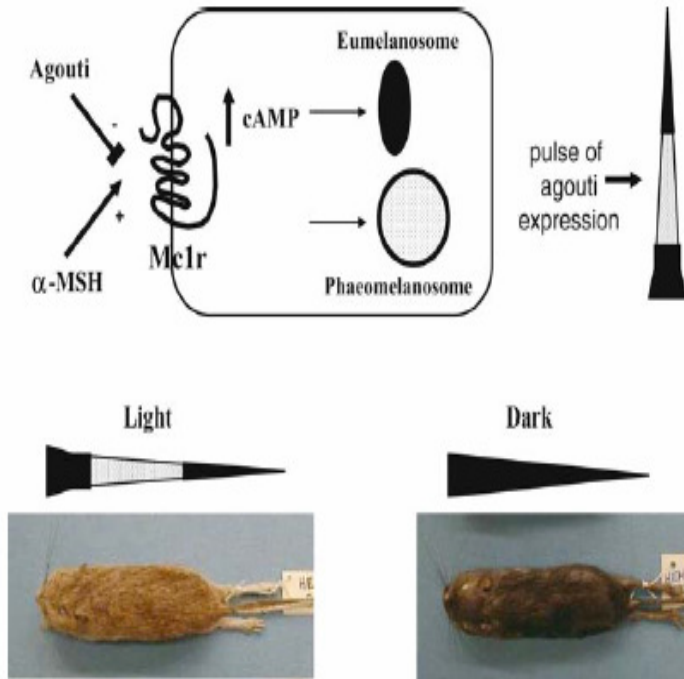


Table 2. Genotype-phenotype associations between *Mclr* alleles and coat color in *C. intermedius* from the Pinacata site

Genotype	Mouse phenotype	
	Light	Dark
DD	0	11
Dd	0	6
dd	12	0

Figure 2. Regulatory control of melanogenesis (top) and typical light and dark *C. intermedius* (bottom). Alpha-MSH signals MC1R, resulting in higher levels of cAMP and production of eumelanin. Agouti is an antagonist that increases production of phaeomelanin. Agouti expression during the haircycle results in a banding pattern on individual hairs, a phenotype known as the 'agouti' hair (shown at right). Light *C. intermedius*, typically found on light-colored rocks, have agouti hairs on their dorsum, while dark *C. intermedius*, typically found on lava, have unbanded, uniformly melanic hairs on their dorsum. See text for further details.

Seleccção em *Chaetodipus intermedius*



Seleccção em *Homo sapiens*

Grupo sanguíneo Duffy

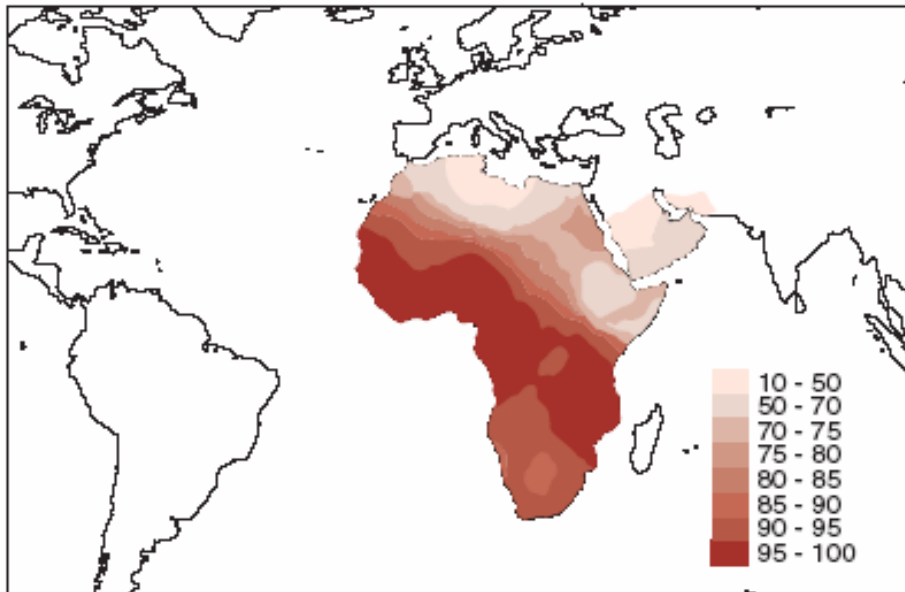
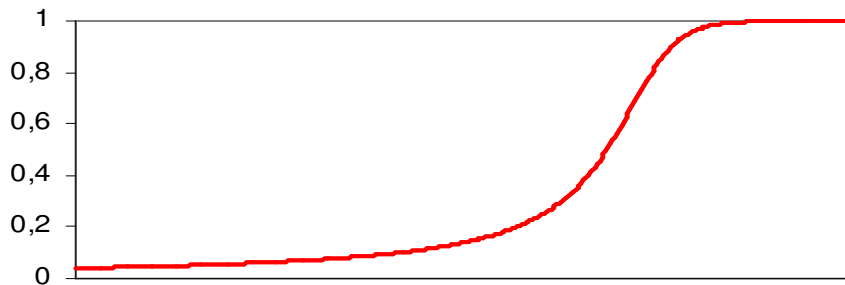
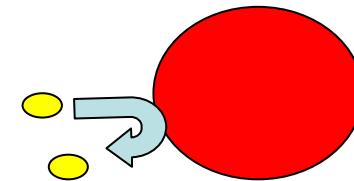


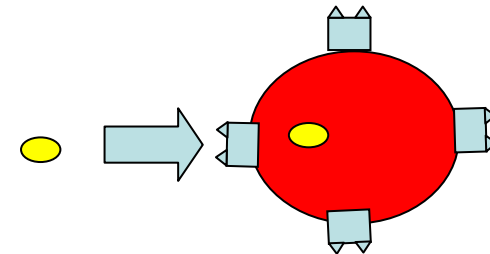
Fig. 5. Extreme population differences in *FY*O* allele frequency. The *FY*O* allele, which confers resistance to *P. vivax* malaria, is prevalent and even fixed in many African populations, but virtually absent outside Africa (38).



Duffy *FY*O*



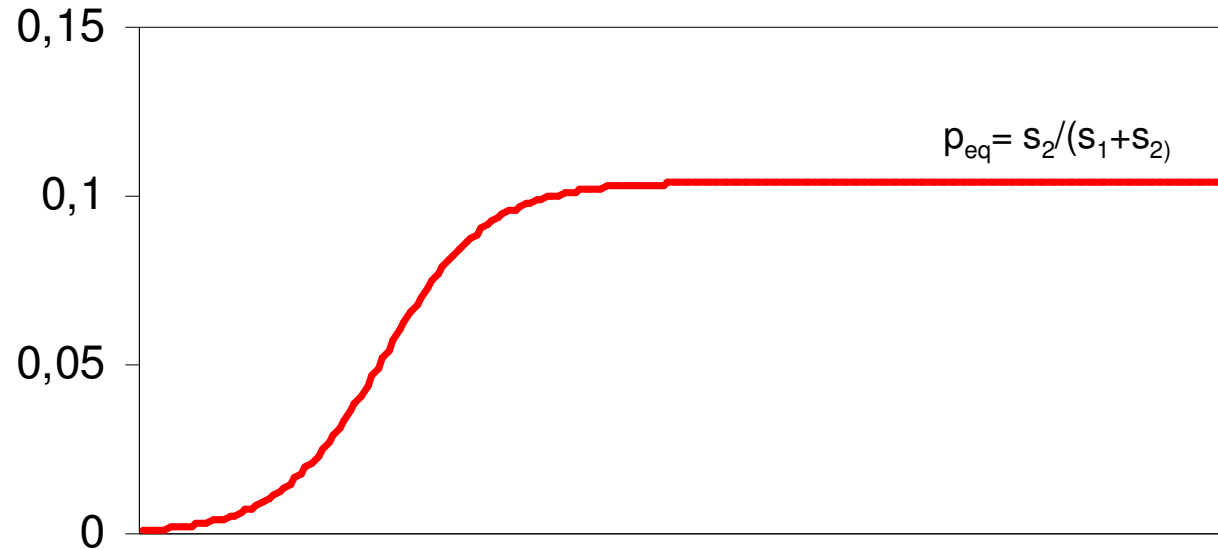
Duffy *FY*A* and *FY*B*



Seleccção equilibrada

- AA **Aa** aa
- p^2 $2pq$ q^2 (nascença)=1
- $p^2 (1-s_1)$ $2pq$ $q^2 (1-s_2)$ (idade reprodutiva)= $1-p^2s_1-q^2s_2$
-
- **$p_{t+1} = p_t / (1 - p_t^2 s_1 - q_t^2 s_2)$** (geração seguinte)

Seleccção equilibrada



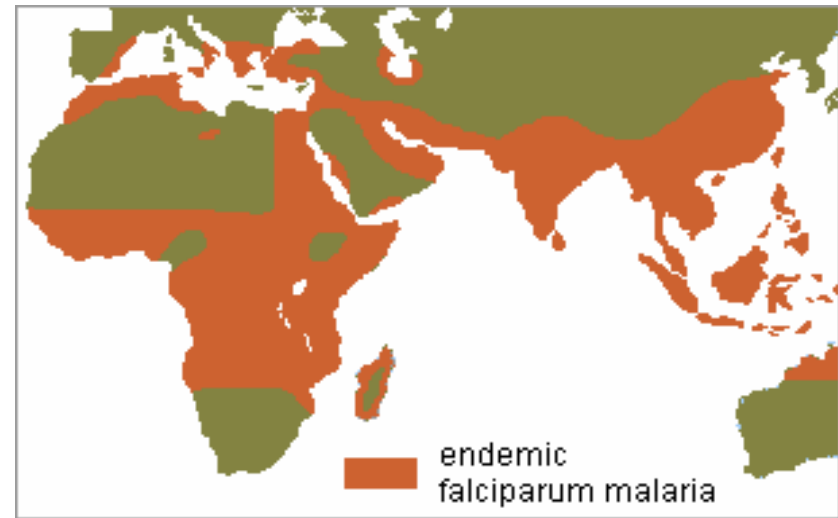
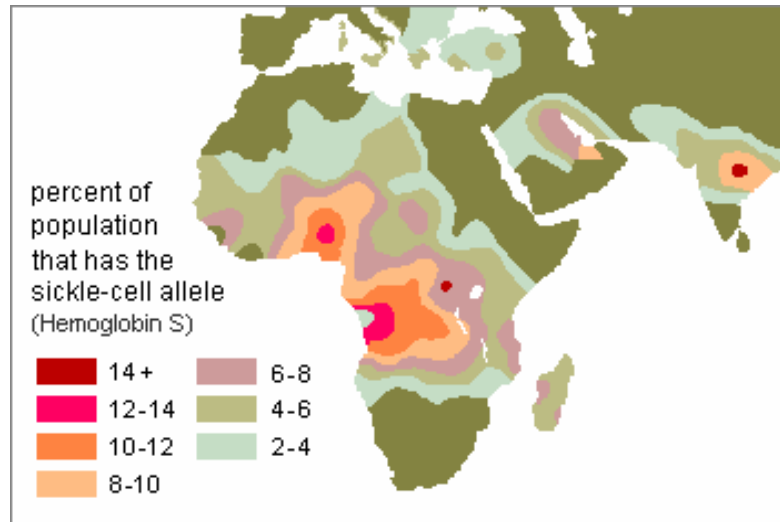
A1A1; $W = 0,14 = 1 - s_1$; $s = 0,86$

A1A2; $W = 1$

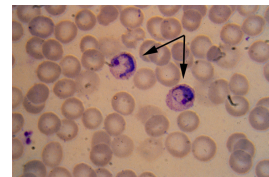
A2A2; $W = 0,9 = 1 - s_2$; $s = 0,10$

$p_0 = 0,001$

Seleccção em *Homo sapiens* *Hemoglobina S*



Hemoglobina β^*S



AA (1-S1)



AS 1



SS (1-S2)

Testes de neutralidade

Comparações interespecíficas

$$\frac{d_N}{d_S} \quad \text{ou} \quad \frac{K_A}{K_S}$$

d_N : fracção de substituições em posições não-sinónimas

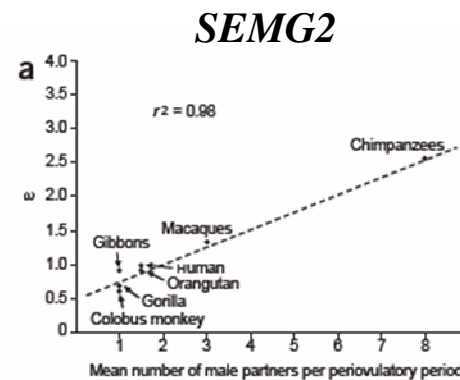
d_S : fracção de substituições em posições sinónimas

Seleccção positiva

$$\frac{d_N}{d_S} > 1$$

Seleccção purificadora

$$\frac{d_N}{d_S} < 1$$



Dorus et al (2004) Nat Genet

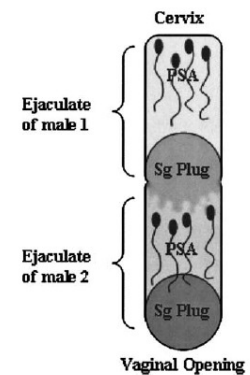
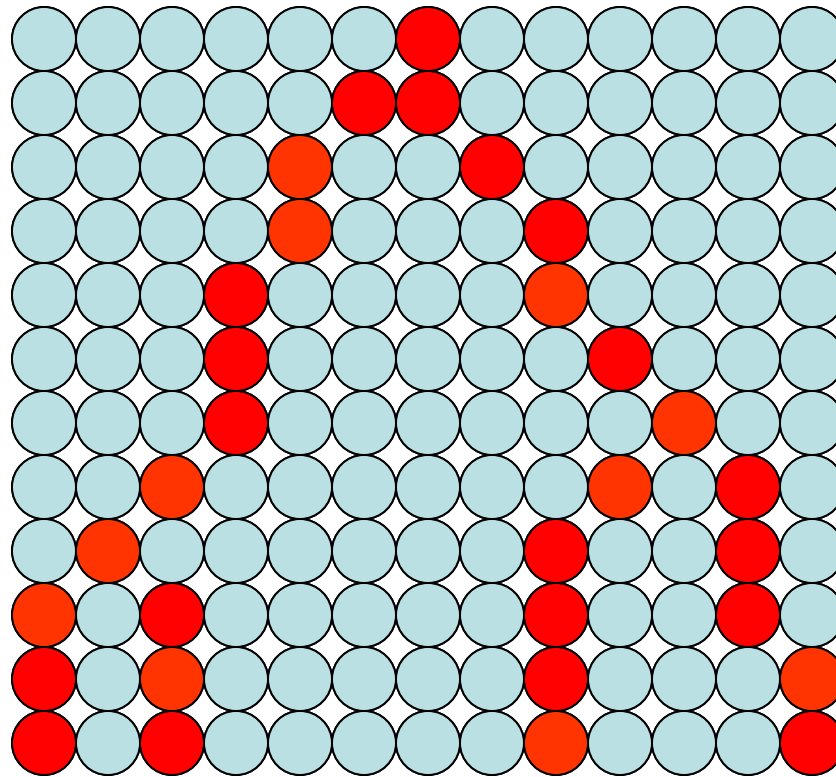
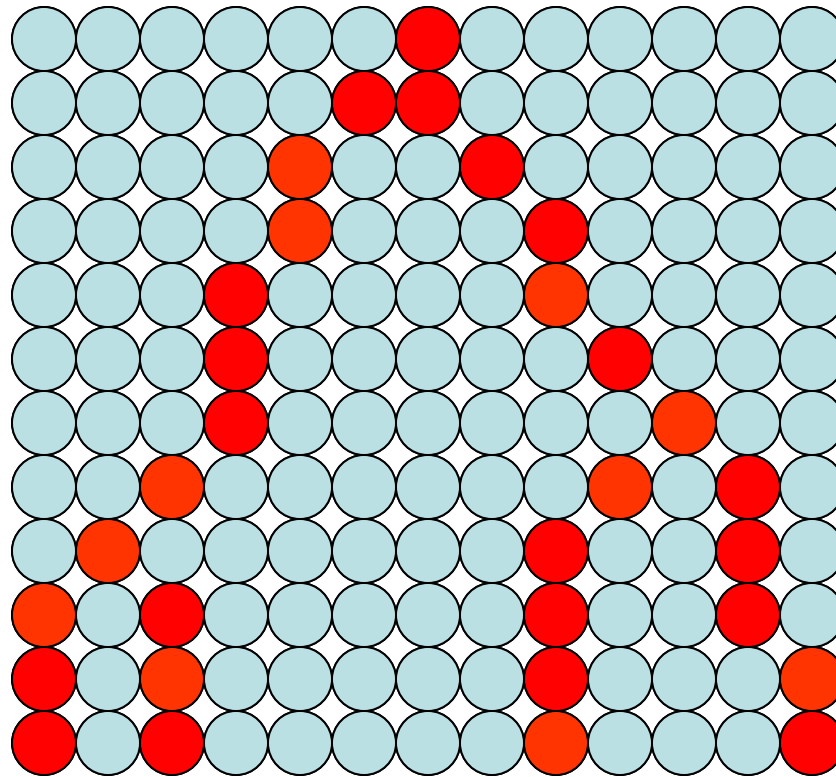


Fig. 1. Schematic of vagina containing ejaculates from two sequential matings. The liquid portion (containing concentrated spermatozoa and PSA) is inseminated first and appears above the semenogelin plug in both ejaculates. The plug of male 1 may block the sperm of male 2 from accessing the ovum, while the PSA of male 2 may degrade the first male's plug.

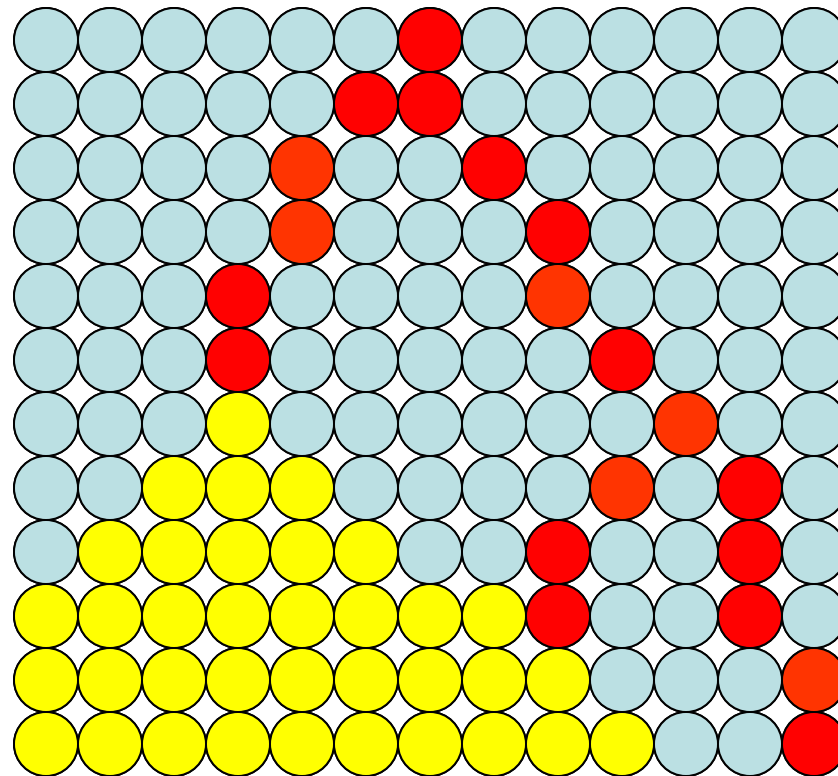
Redução da diversidade genética



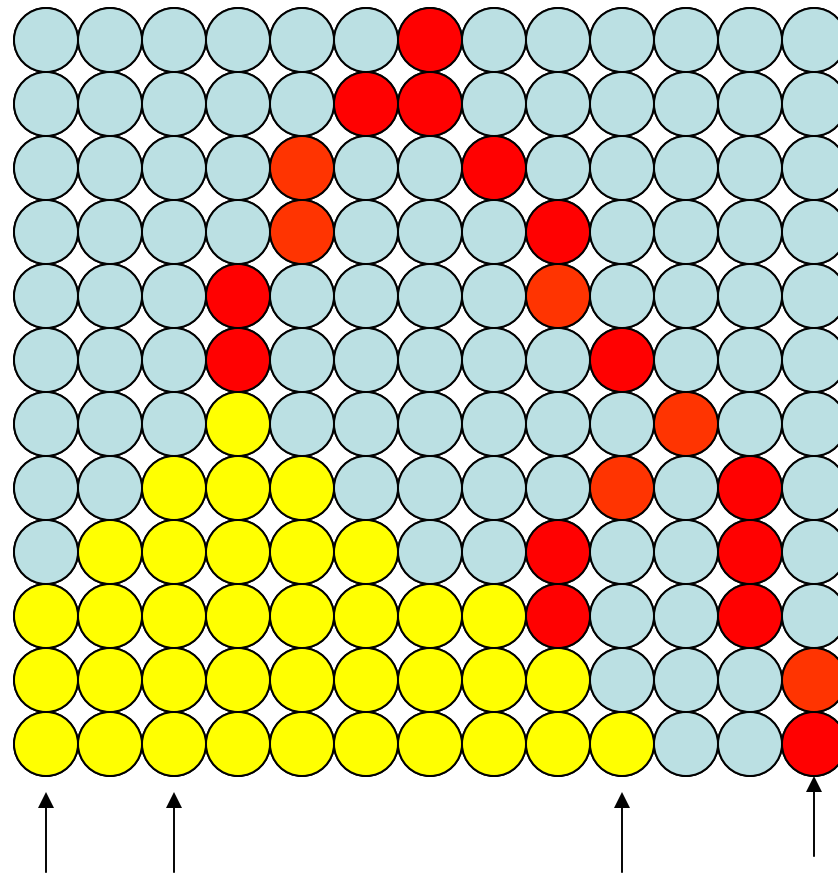
Redução da diversidade genética



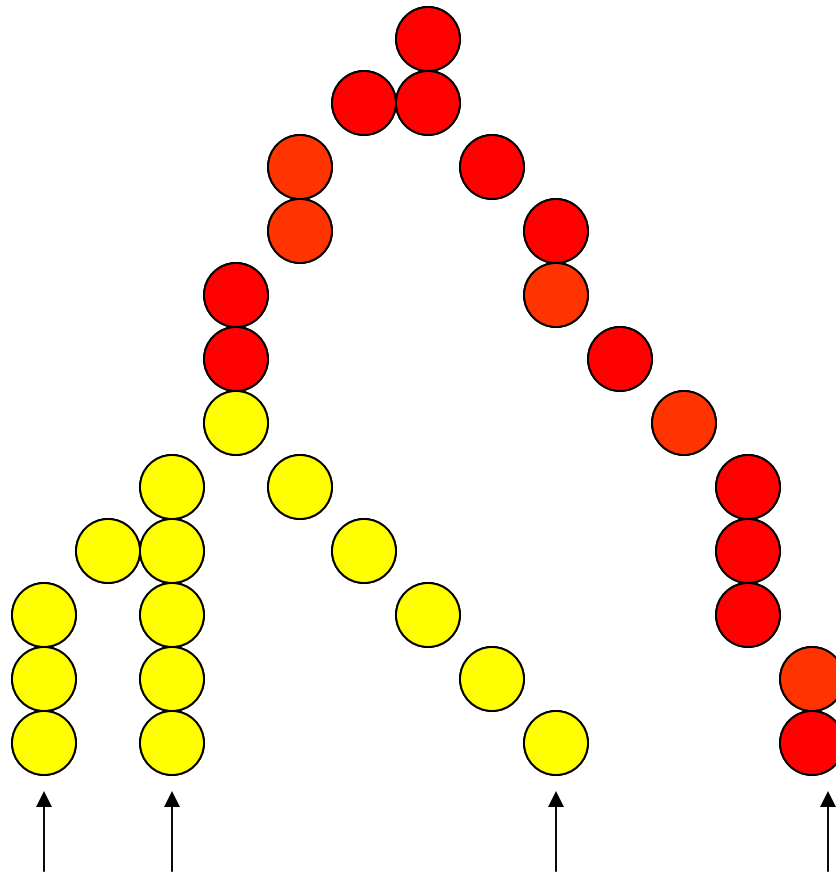
Redução da diversidade genética



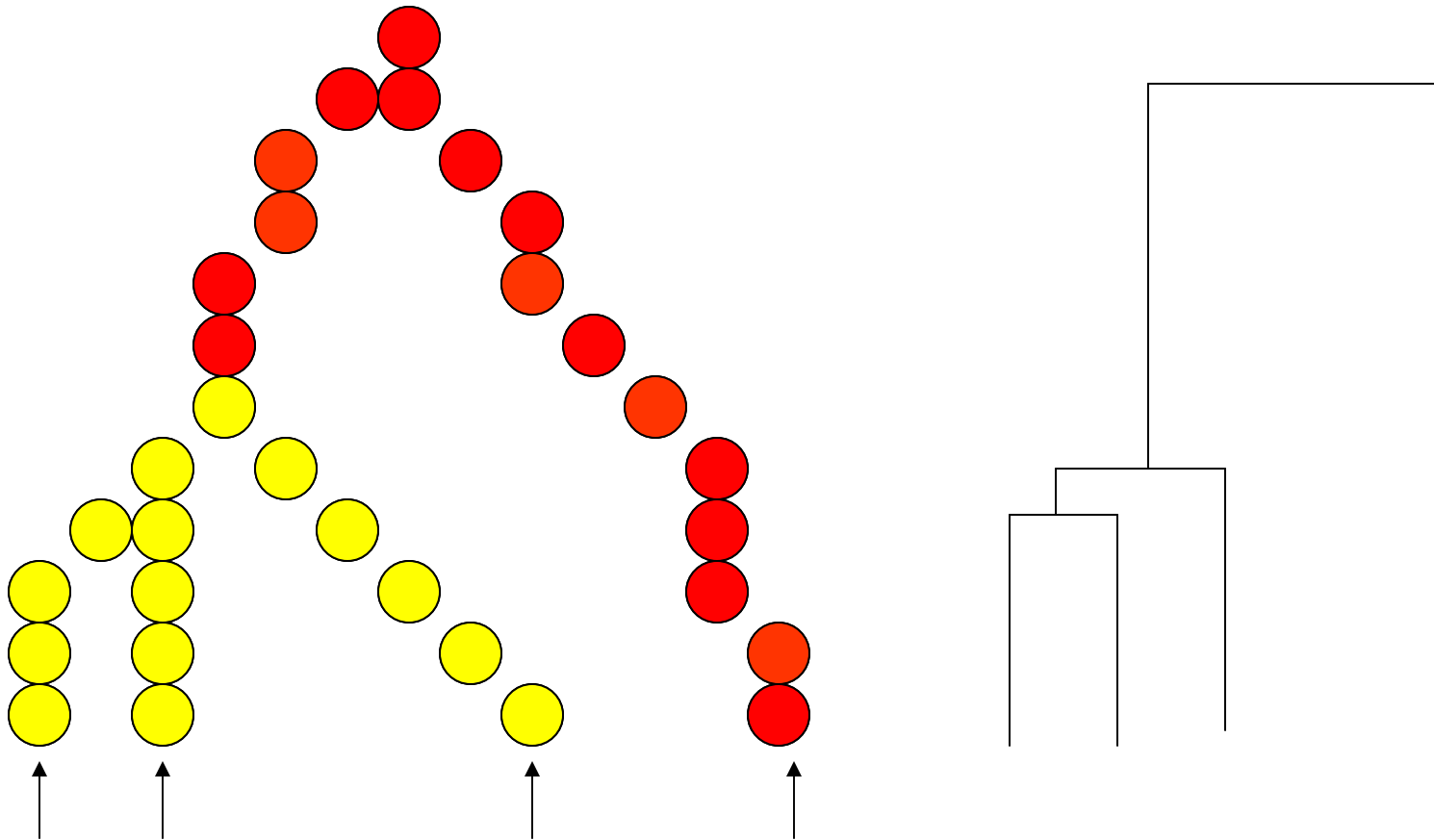
Redução da diversidade genética



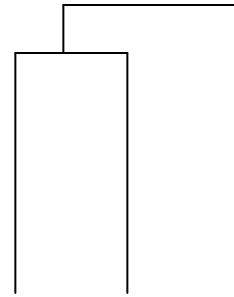
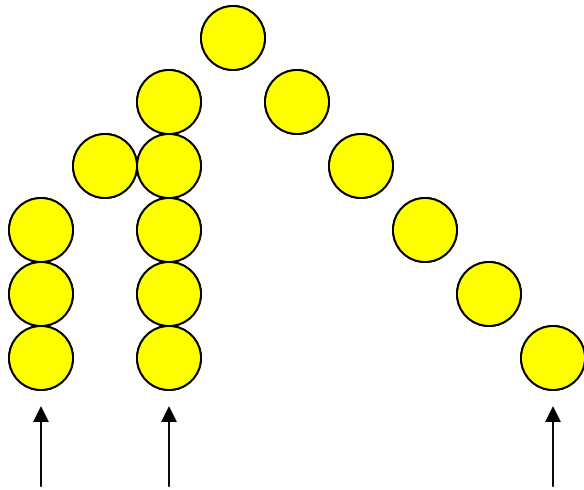
Redução da diversidade genética



Redução da diversidade genética



Redução da diversidade genética



Marcas genéticas de selecção

Seleccção positiva: redução local de diversidade

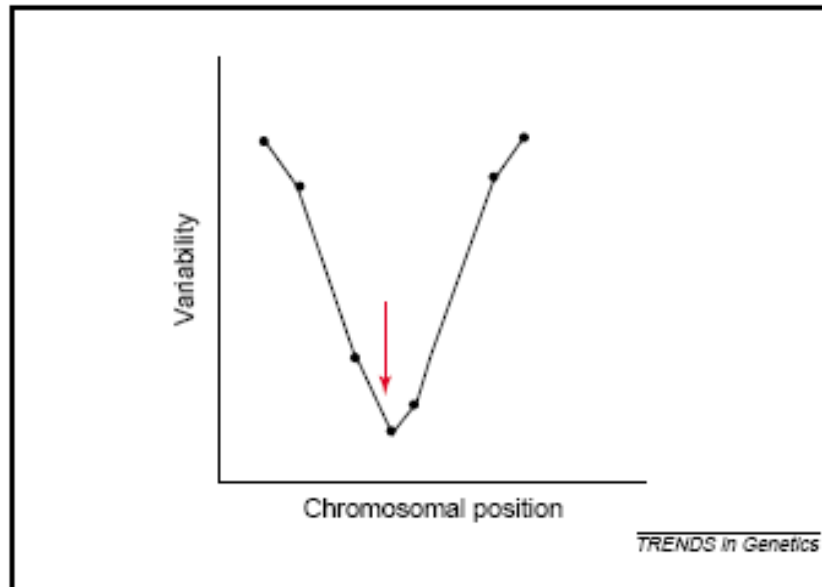


Fig. 2. Expected allele frequency distortion due to a selective sweep. The distortion in allele frequency is measured by a reduction in variability. The position of the selected site is indicated by an arrow, which is very close to the central microsatellite. Note that the positions of only seven markers are given and the variability reduction between them was obtained by interpolation.

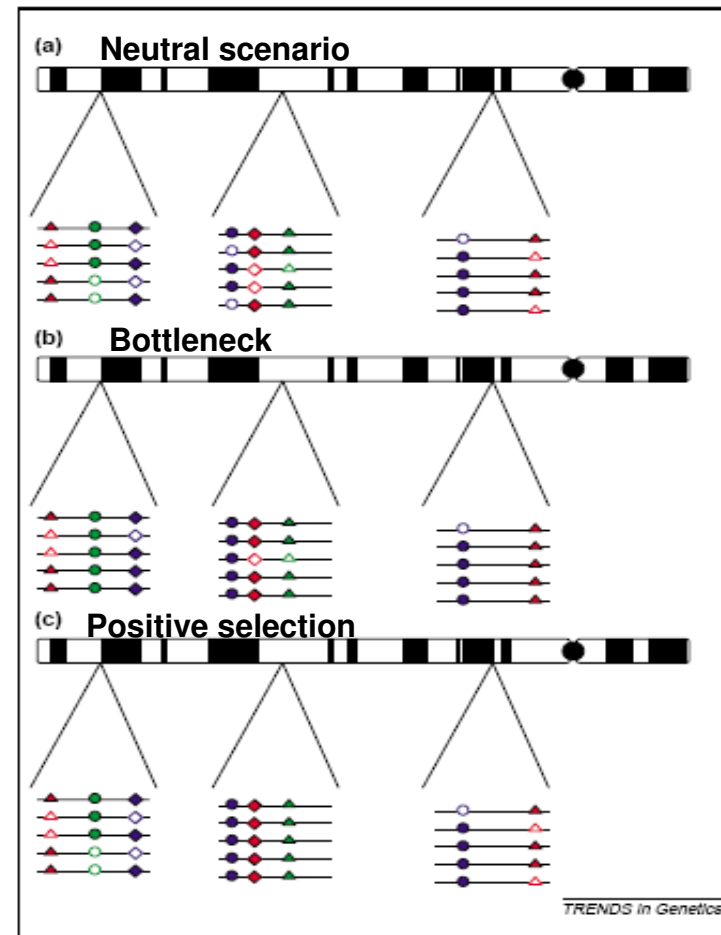
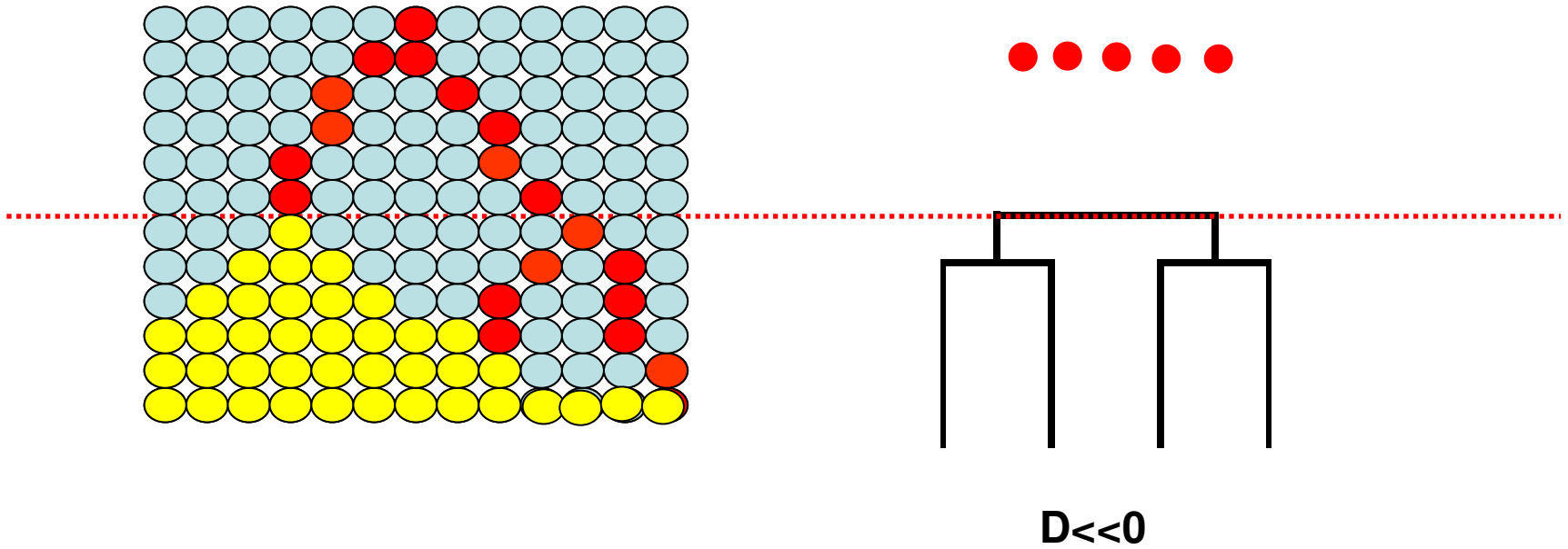


Fig. 1. Partitioning of variability at three different chromosomal locations. For each chromosomal region, segregating variation (e.g. single nucleotide polymorphisms) is indicated by circles, squares and triangles. Allelic states are distinguished by filled and empty symbols. (a) Neutral scenario in a population of constant size. (b) Population bottleneck leading to genome wide reduction in variability. (c) The central genomic region was subjected to a recent selective sweep, resulting in a reduced variability and linkage disequilibrium at this locus only.

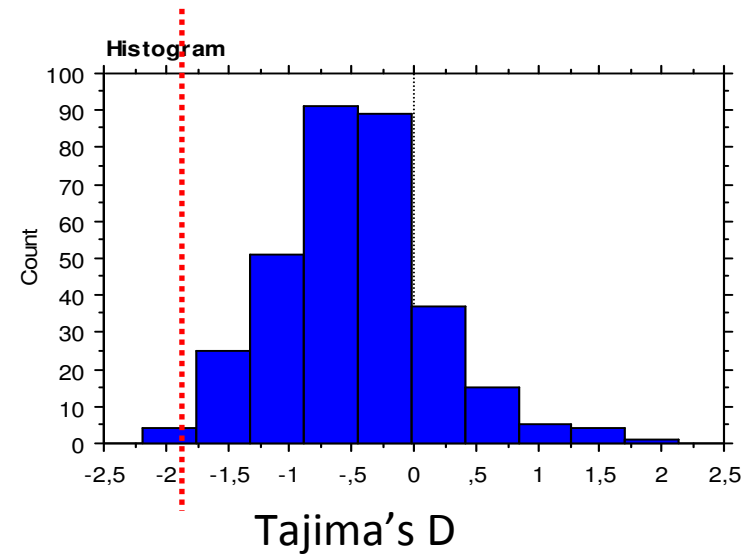
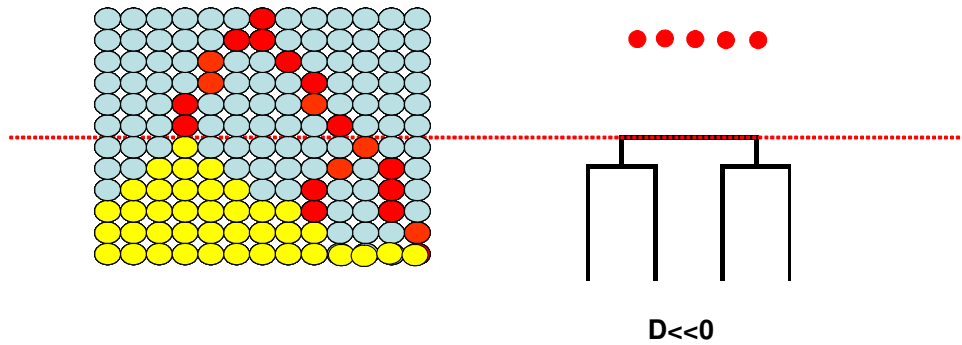
Marcas genéticas de selecção

Seleccção positiva completa: valores negativos de D

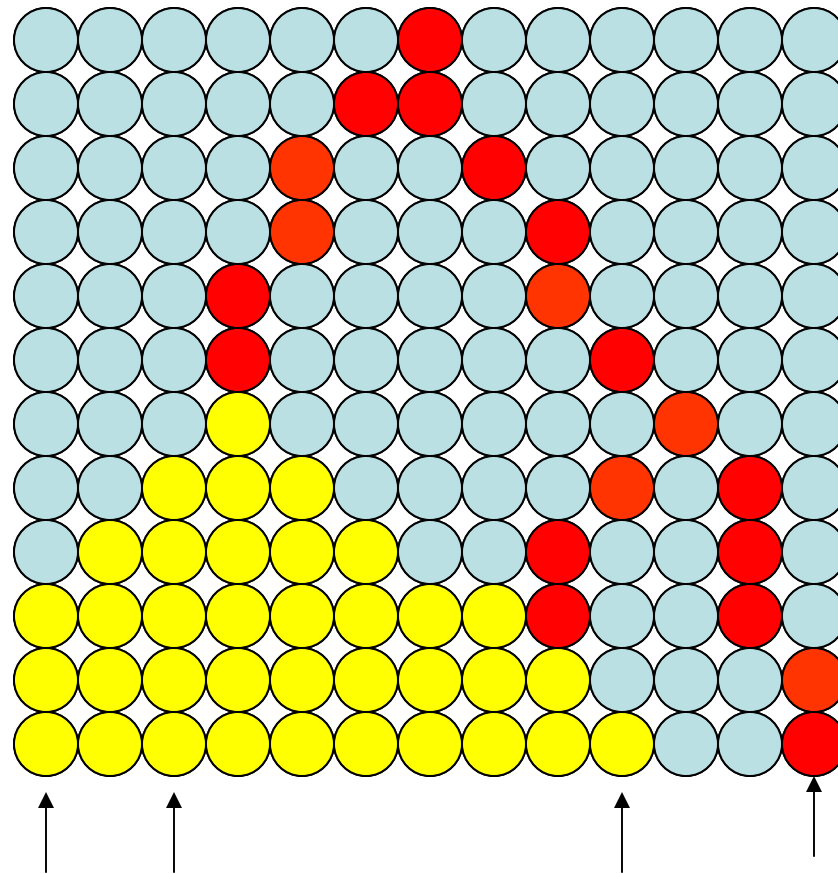


Marcas genéticas de selecção

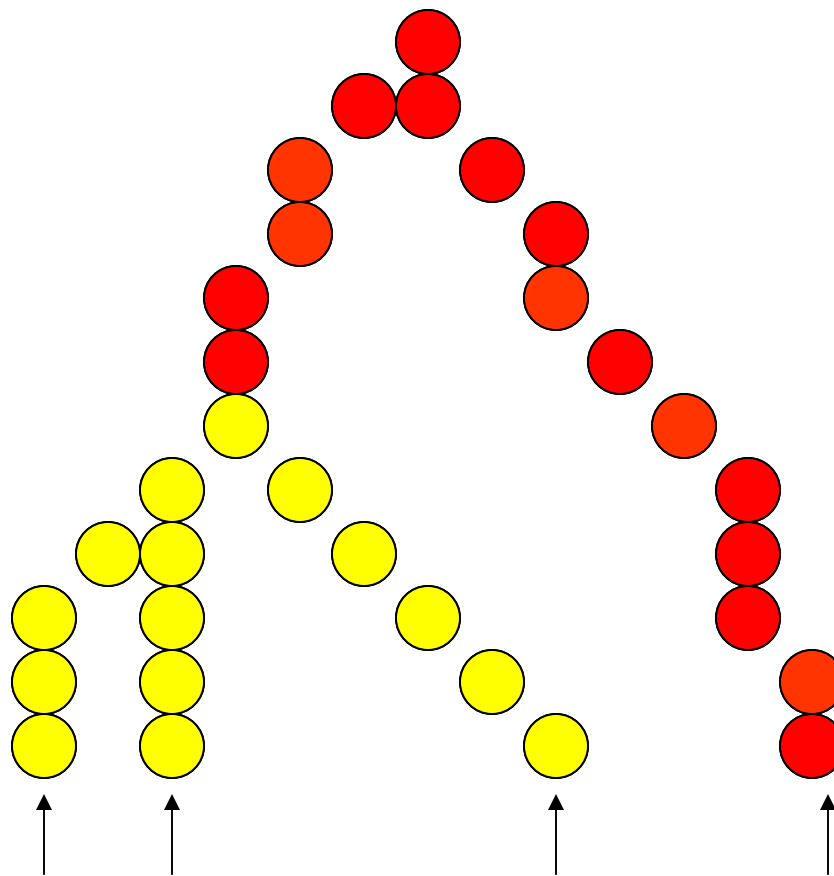
Testes de D baseados em distribuições empíricas



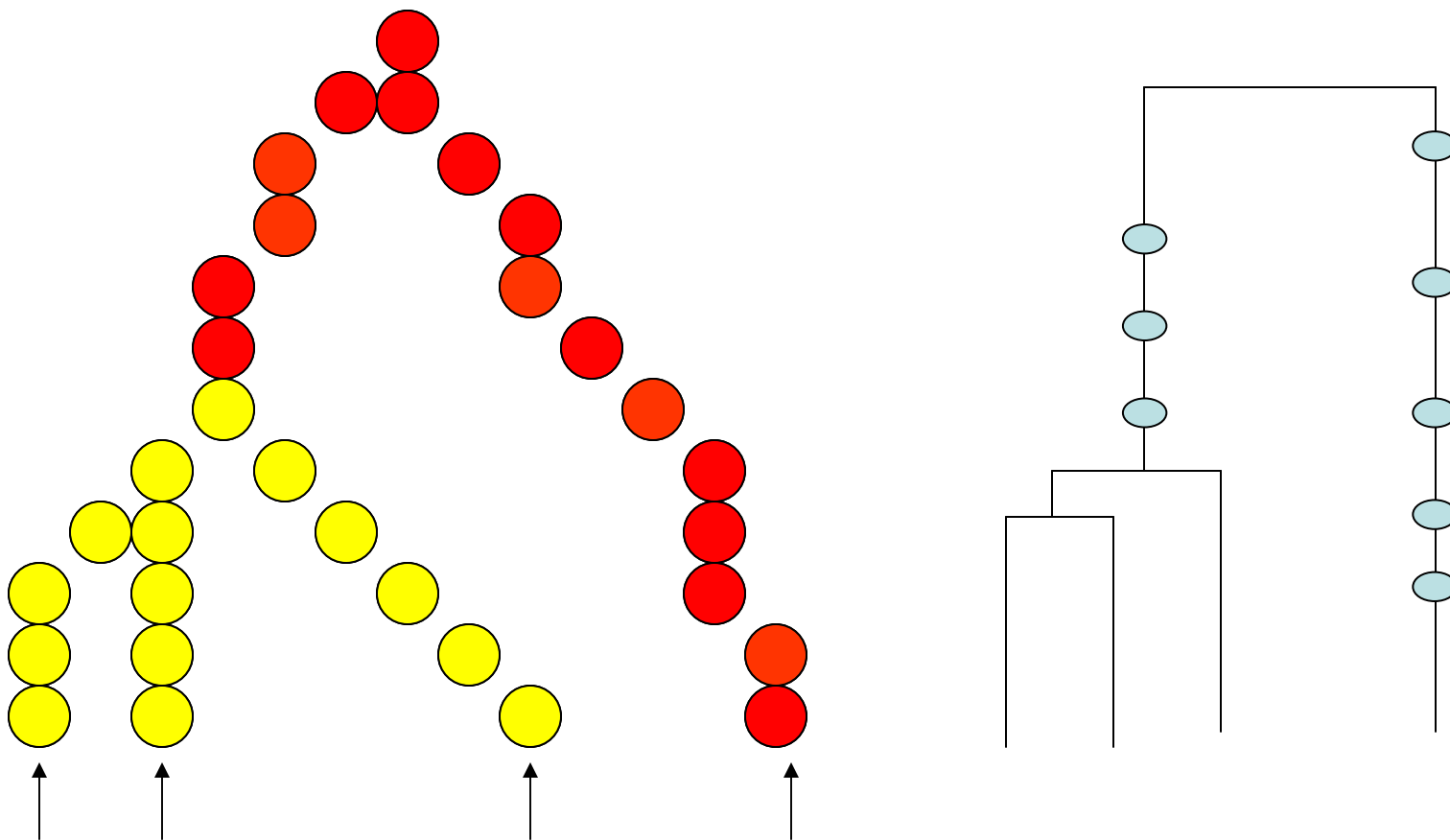
Testes de partição haplotípica



Testes de partição haplotípica

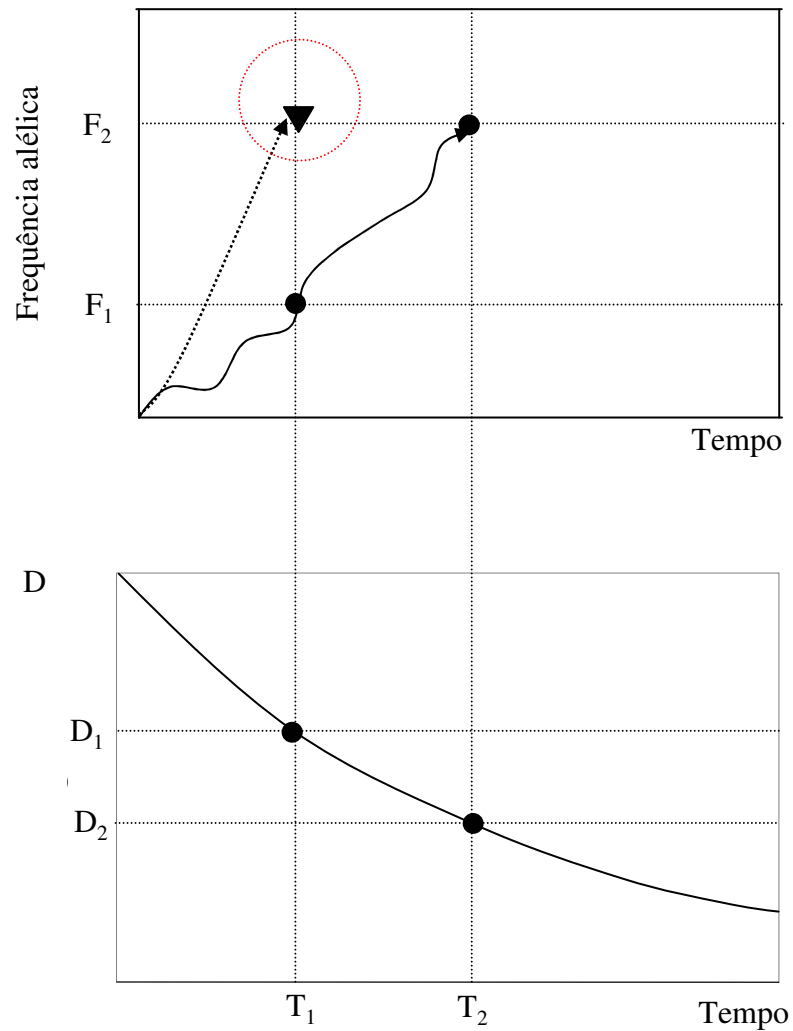


Testes de partição haplotípica



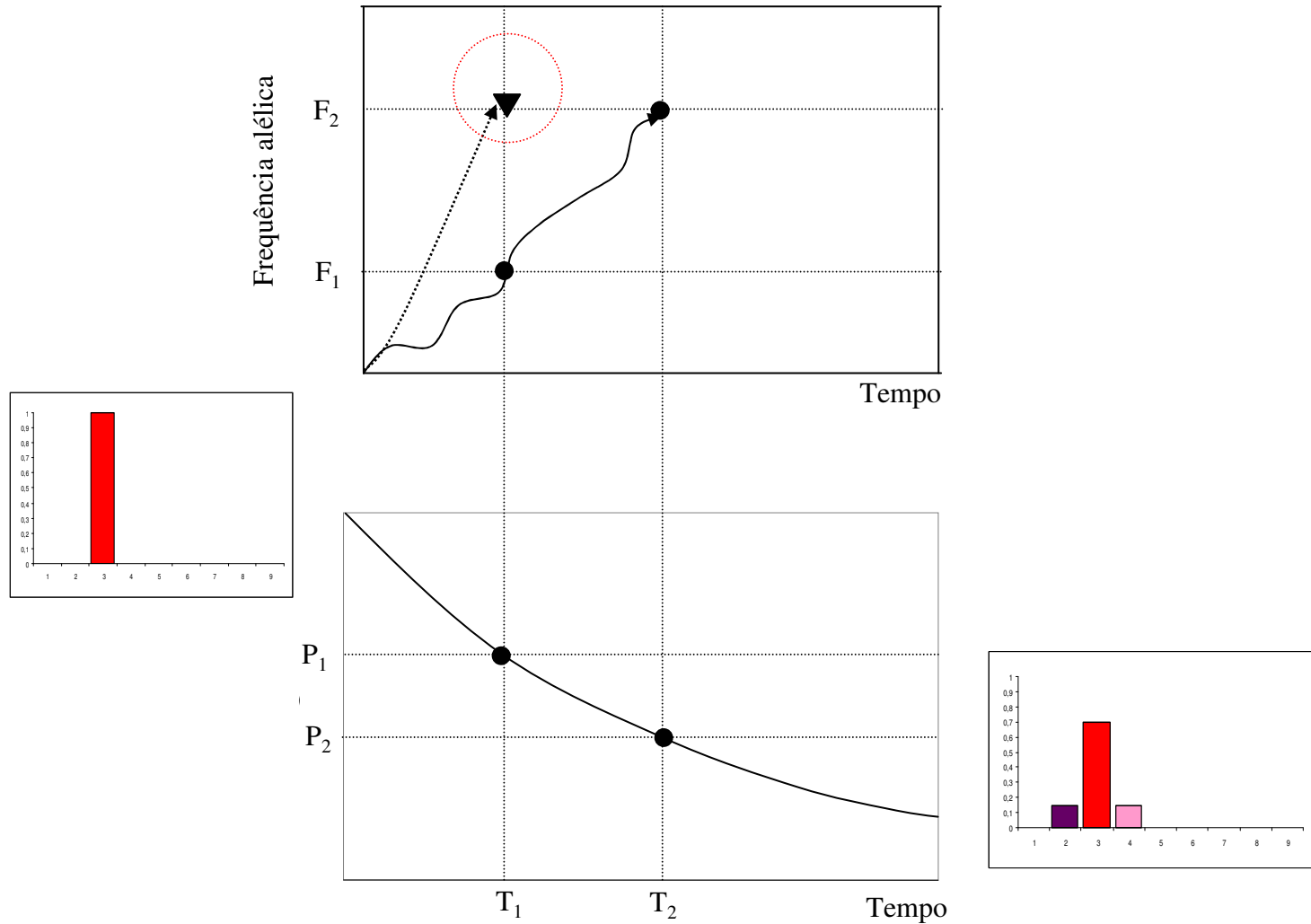
Marcas genéticas de selecção

Seleccção positiva incompleta: dissociação idade/freqüência



Marcas genéticas de selecção

Seleccção positiva incompleta: dissociação idade/freqüência



Diferenciação interpopulacional

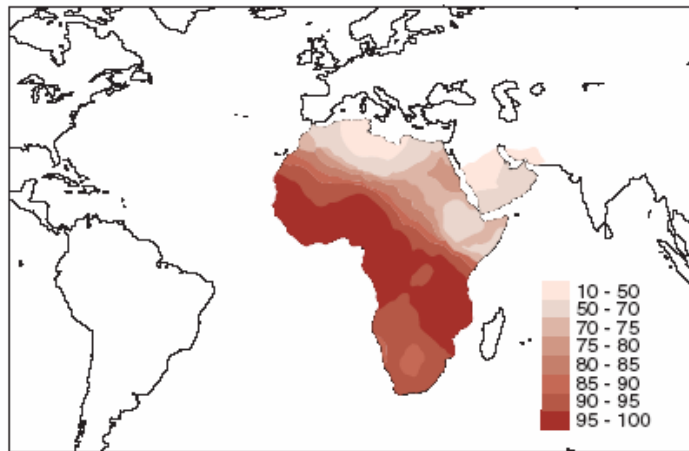
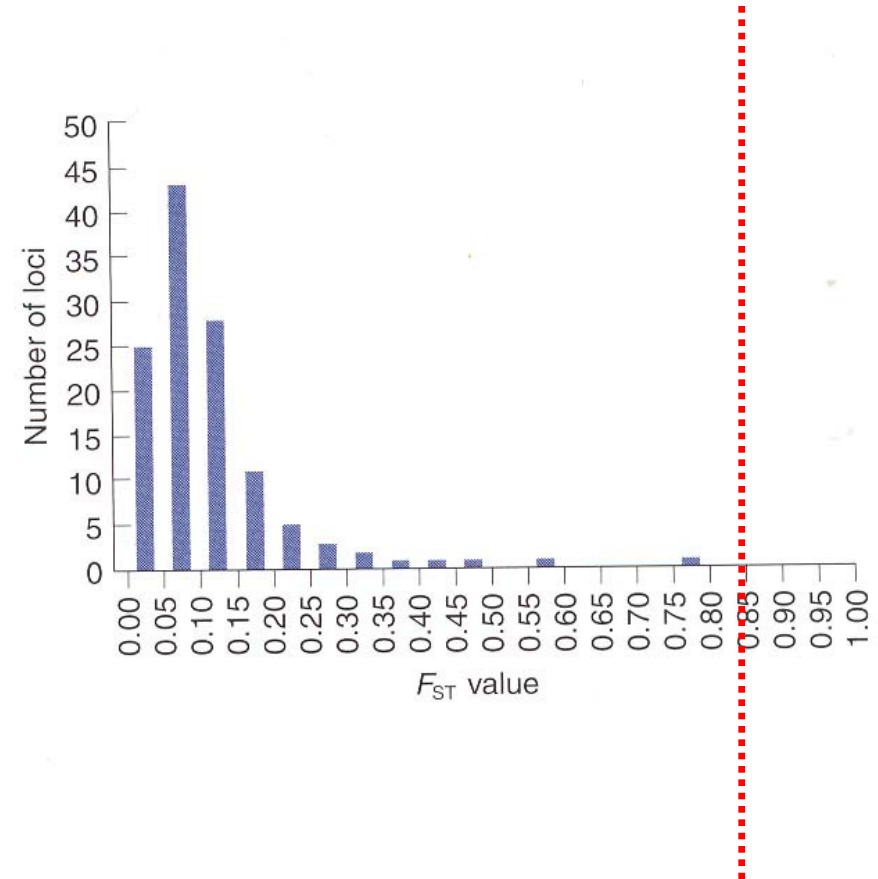
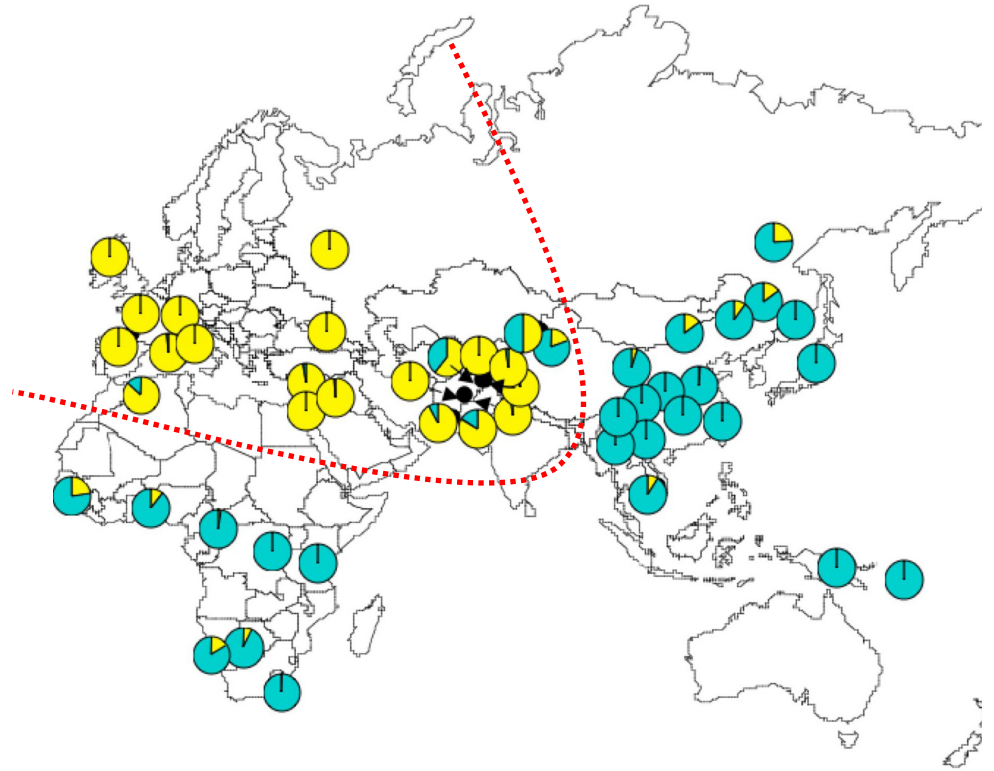
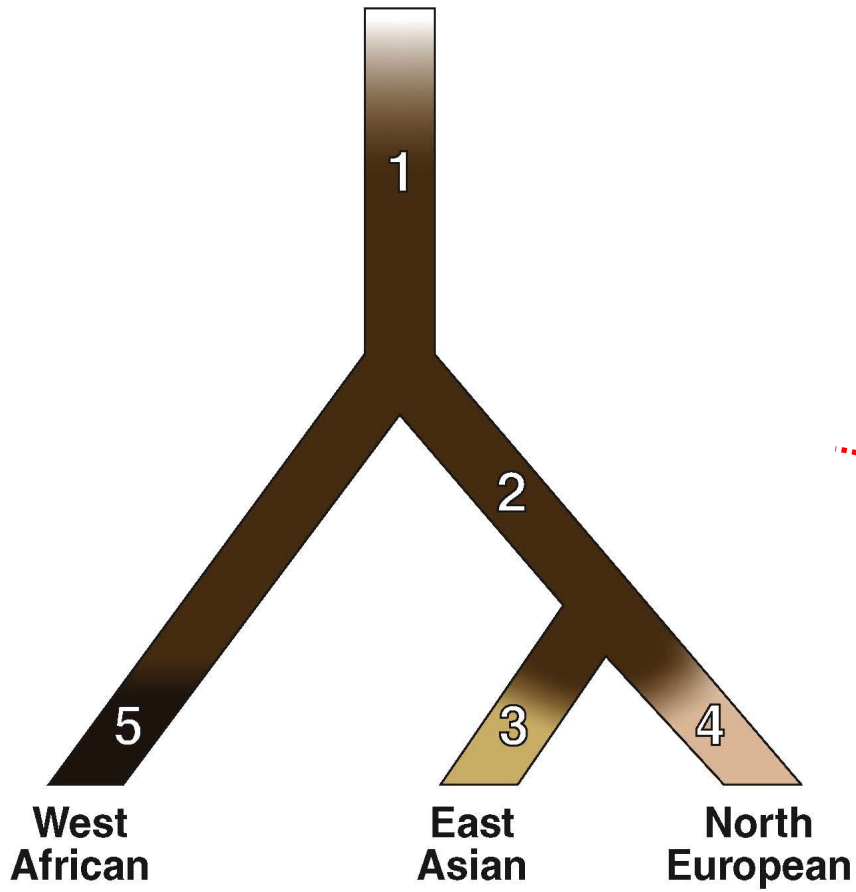


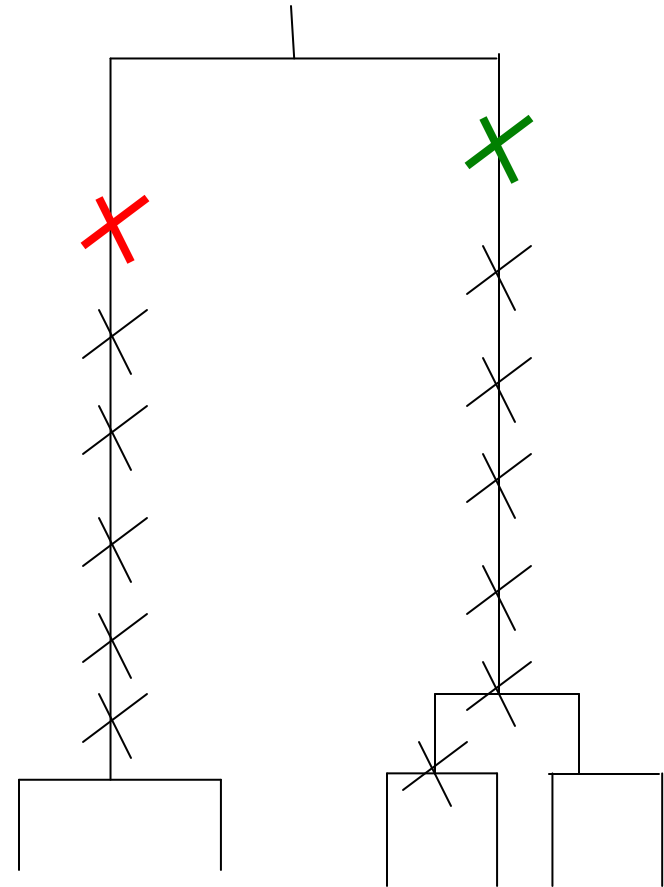
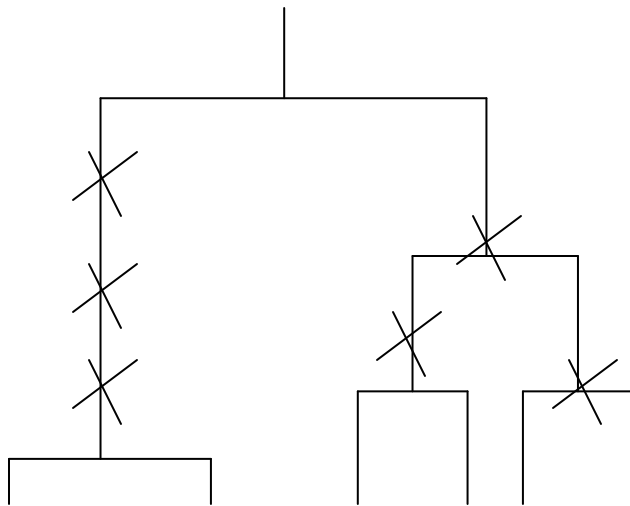
Fig. 5. Extreme population differences in *FY*O* allele frequency. The *FY*O* allele, which confers resistance to *P. vivax* malaria, is prevalent and even fixed in many African populations, but virtually absent outside Africa (38).



SLC24A5 A111G



D de Tajima / Seleccção equilibrada



D de Tajima /Seleccção equilibrada

