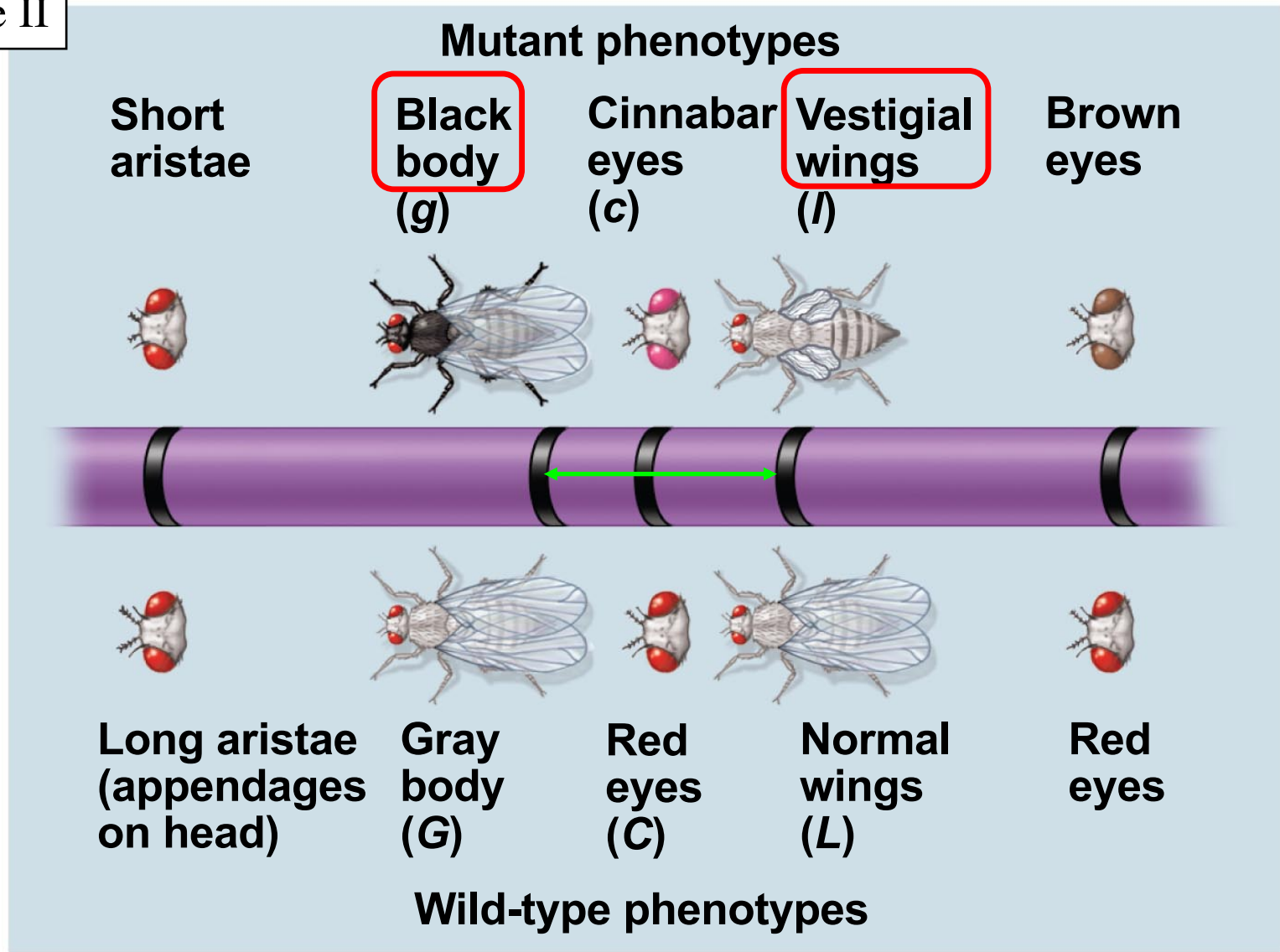
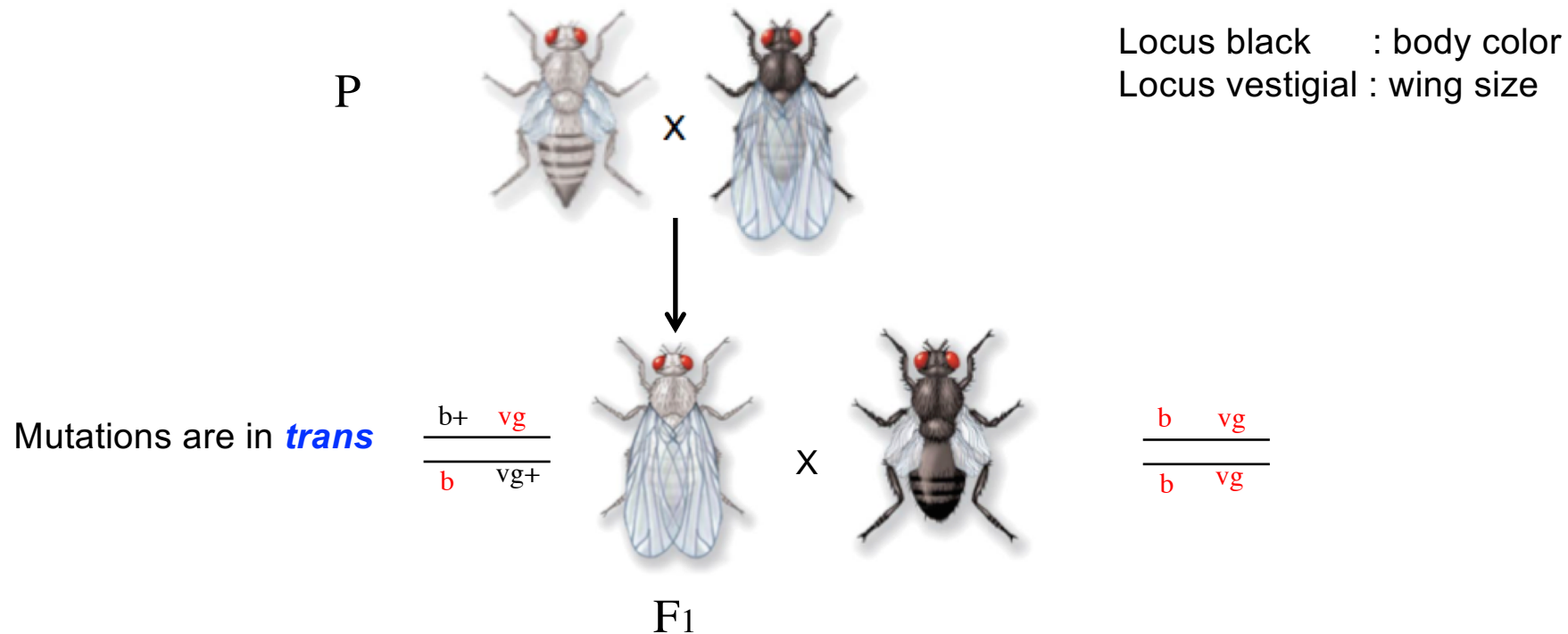


Chromosome II

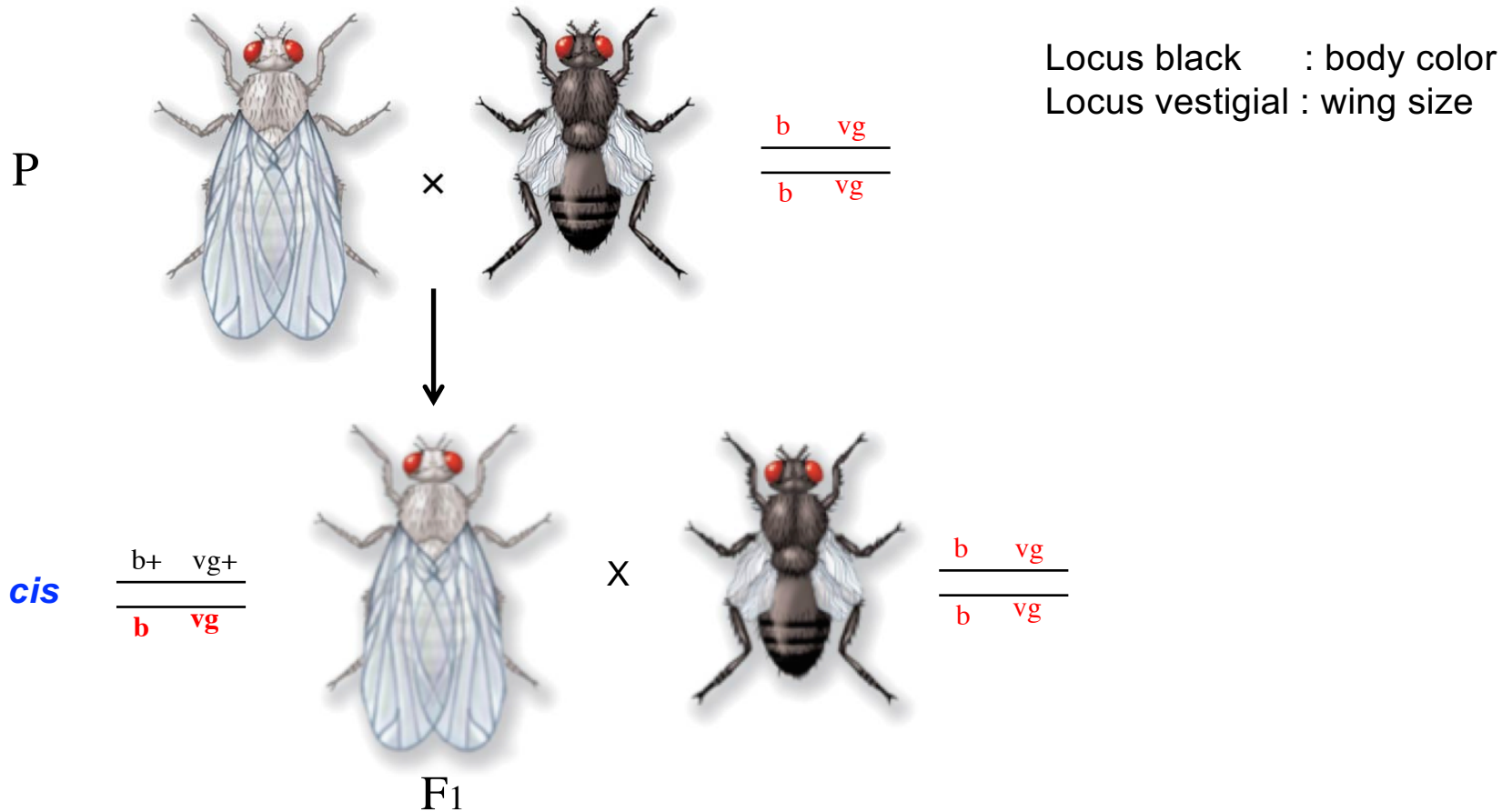
Question :
What is the **genetic distance** between the **black locus** and the **vestigial locus** ?



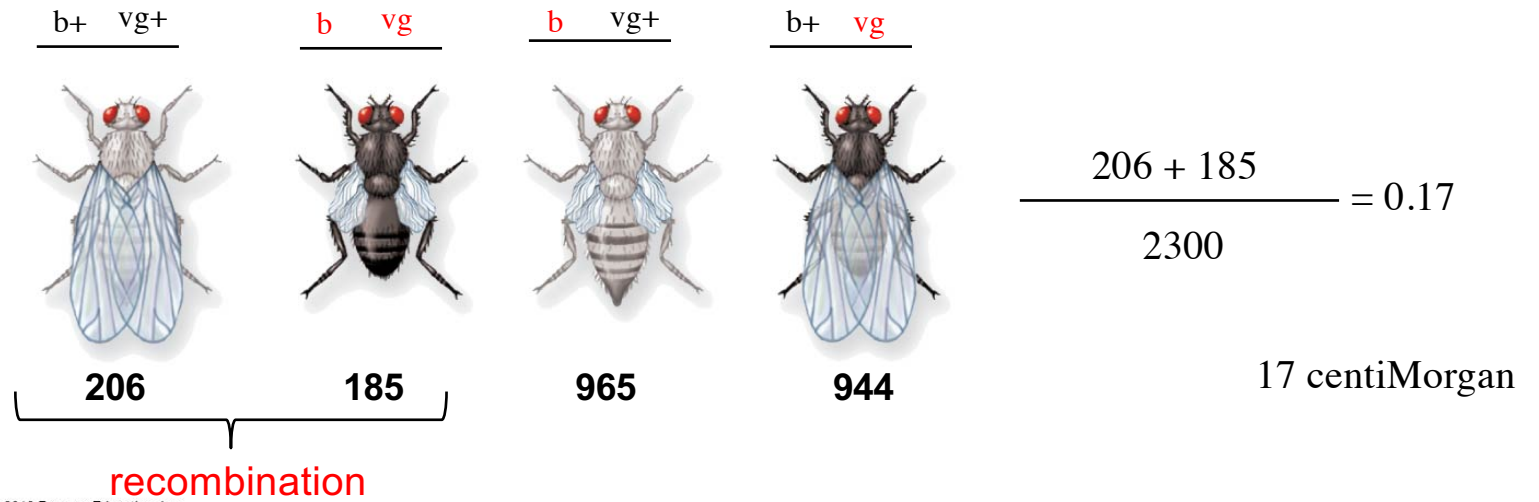
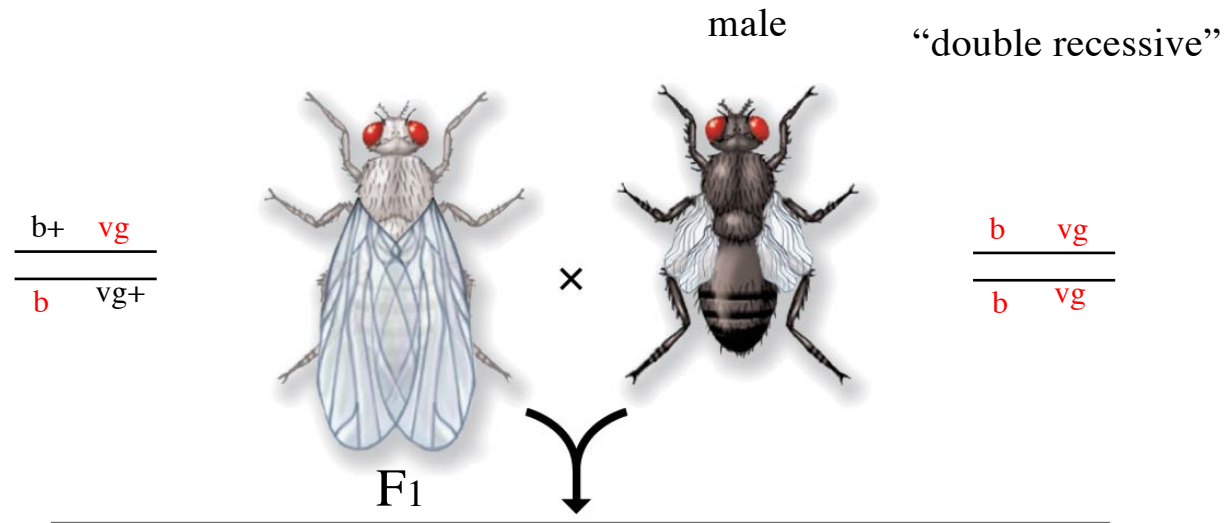
Measuring the genetic distance between 2 loci:



Measuring the genetic distance between 2 loci:

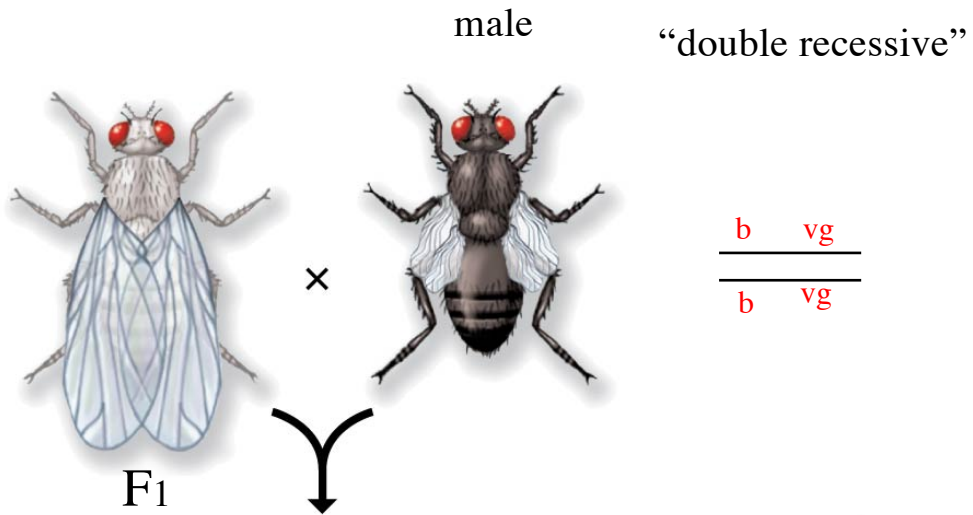


Mutations are in *trans*



Mutations are in *cis*

$$\frac{b^+ \quad vg^+}{b \quad vg}$$



965



944



206



185

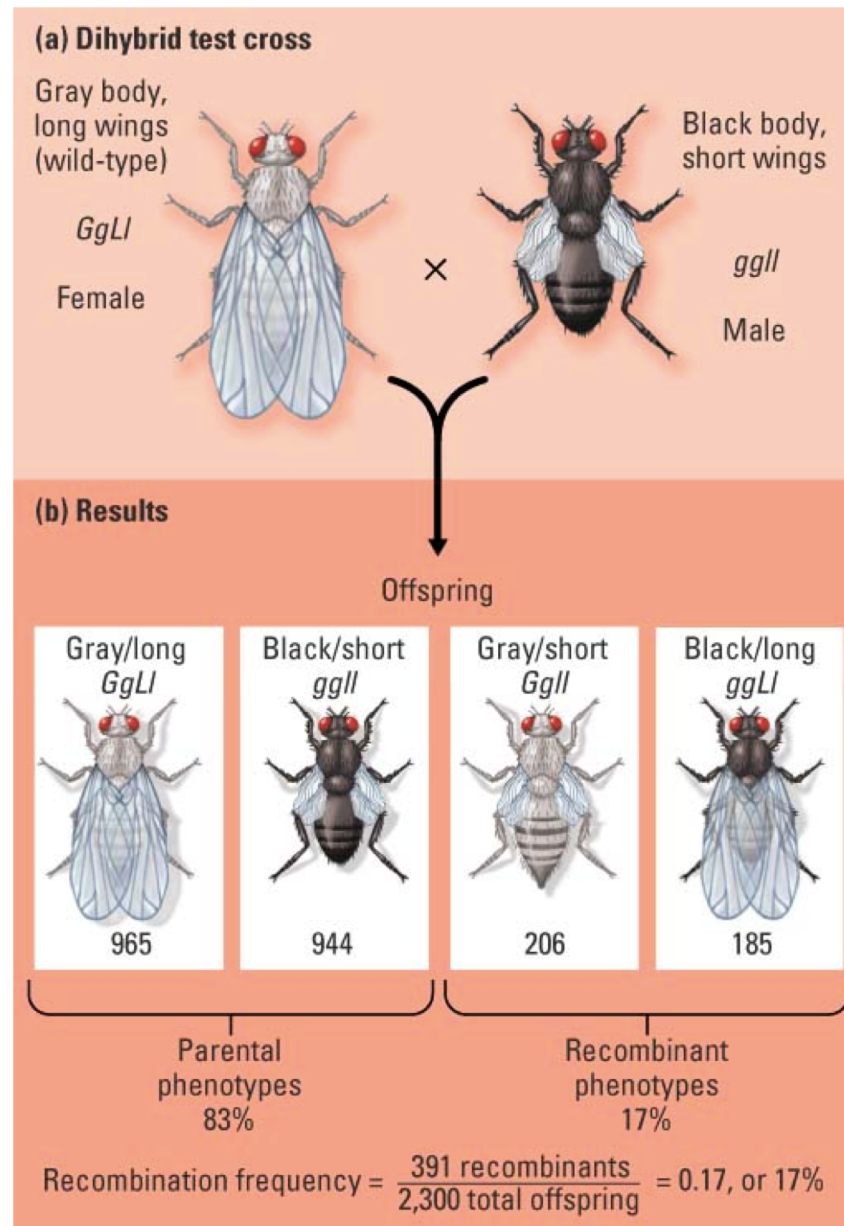
$$\frac{206 + 185}{2300} = 0.17$$

17 centiMorgan

recombination

In textbooks, the mutations are in *cis*.

The case with mutations in *trans* is omitted.

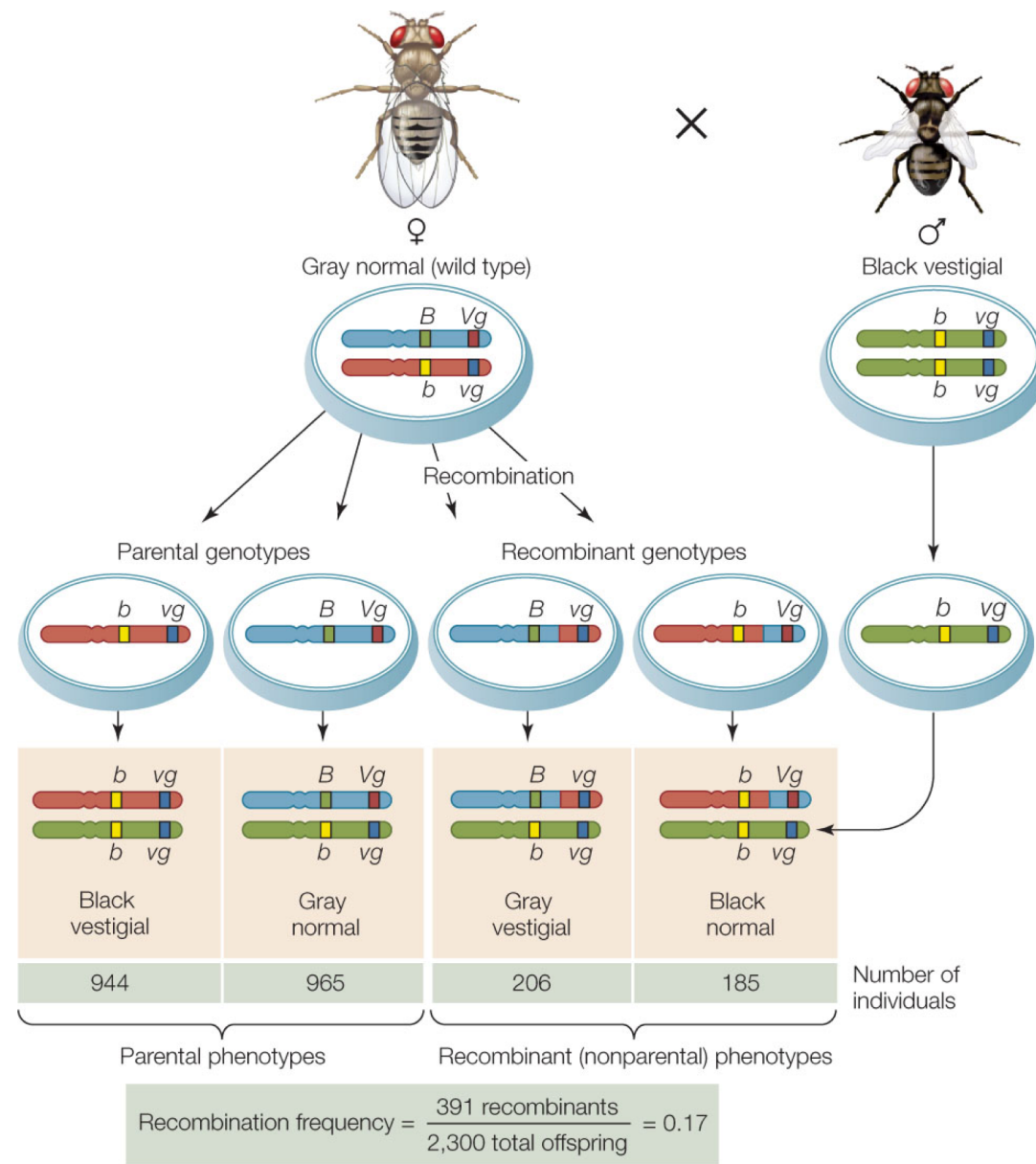


Essential Biology
Fig 9.24

Hillis, chapter 8

We observe crossovers during meiosis in the female. The female produces 4 types of gametes.

The phenotype of the offspring reflects the genetic information transmitted by the mother.



The male produces only 1 type of gametes

What is expected from you :

1. Given the genetic distance between the 2 loci and the number of offspring you should be able to calculate the expected numbers for all 4 phenotypes.
2. Given the numbers for all 4 phenotypes among the offspring you should be able to calculate the genetic distance between the 2 loci.

Remarkable cases :

$d < 50\text{cM}$ Detection of linkage

$d = 50\text{ cM}$ $\frac{25 + 25}{25 + 25 + 25 + 25} = 0.5$

The loci behave as if they were not linked

$d > 50\text{ cM}$ The genetic distance cannot be deduced from one single cross; several crosses are needed to measure the genetic distance.