

## EXPERIMENT NO. 4

AIM OF THE EXPERIMENT: To prepare linkage map based on Drosophila. crosses.

### THEORY

When two genes are present on the same chromosome, instead of following Mendelian pattern of inheritance, the  $F_2$  have a different ratio. This is because when two genes are present in the same chromosome they tend to remain together in one gamete, a process called linkage. and the genes are called genes. Closer the genes, the linkage tendency is more or stronger. In such a case recombinant phenotypes will be less. and more  $F_2$  individual will have parental character combinations.

The percentage of recombinant indicates the distance between the two genes, which is exploited to determine relative position of two or more genes of the same chromosome. Such mapping of genes is called linkage mapping, first performed by T.H Morgan in Drosophila.

### MATERIALS -

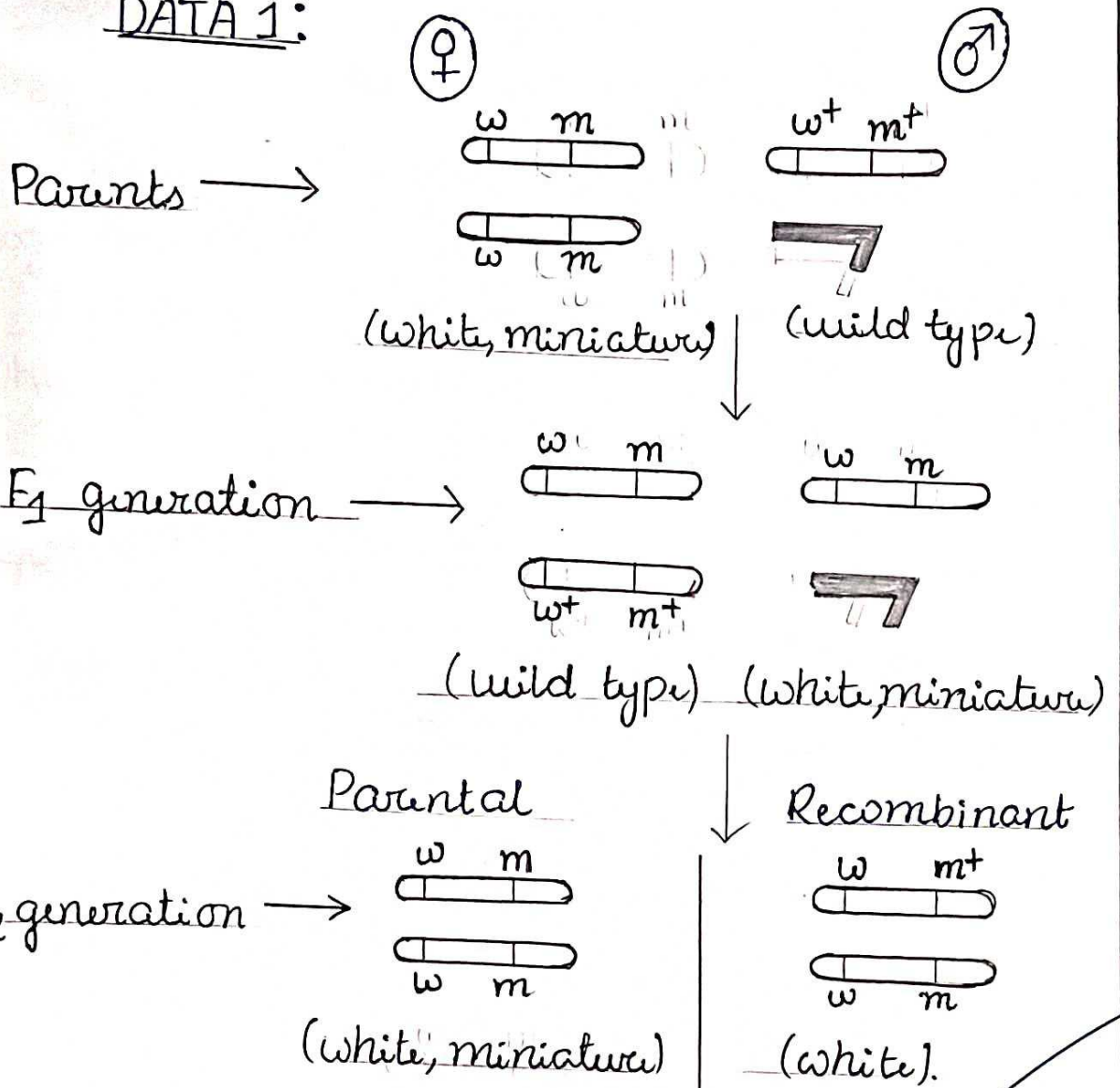
Data 1: The cross between a white-eyed miniature winged female Drosophila with a normal male.

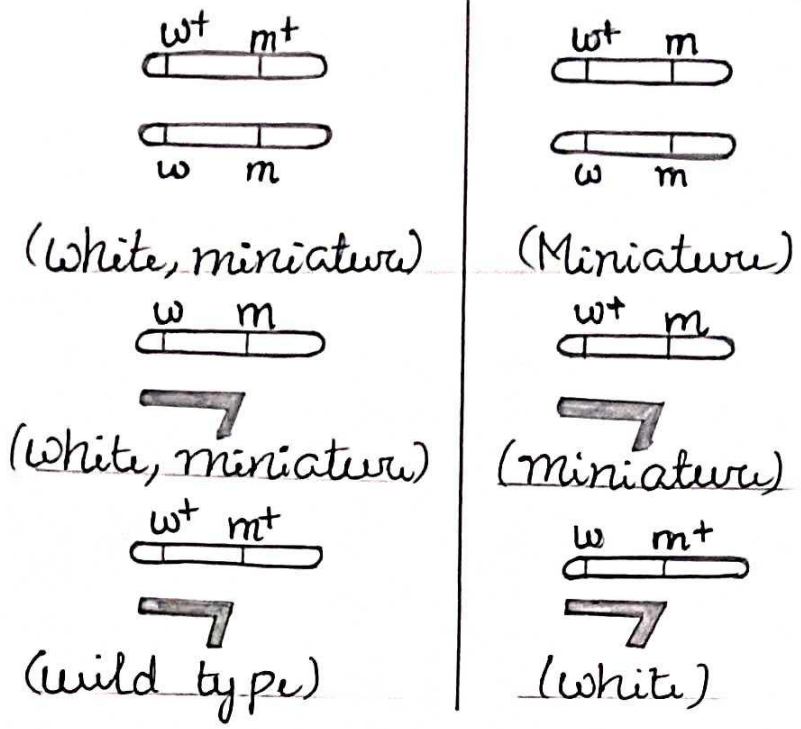
Data 2: A cross between a yellow-bodied white-eyed female Drosophila with a normal male.

PROCEDURE -

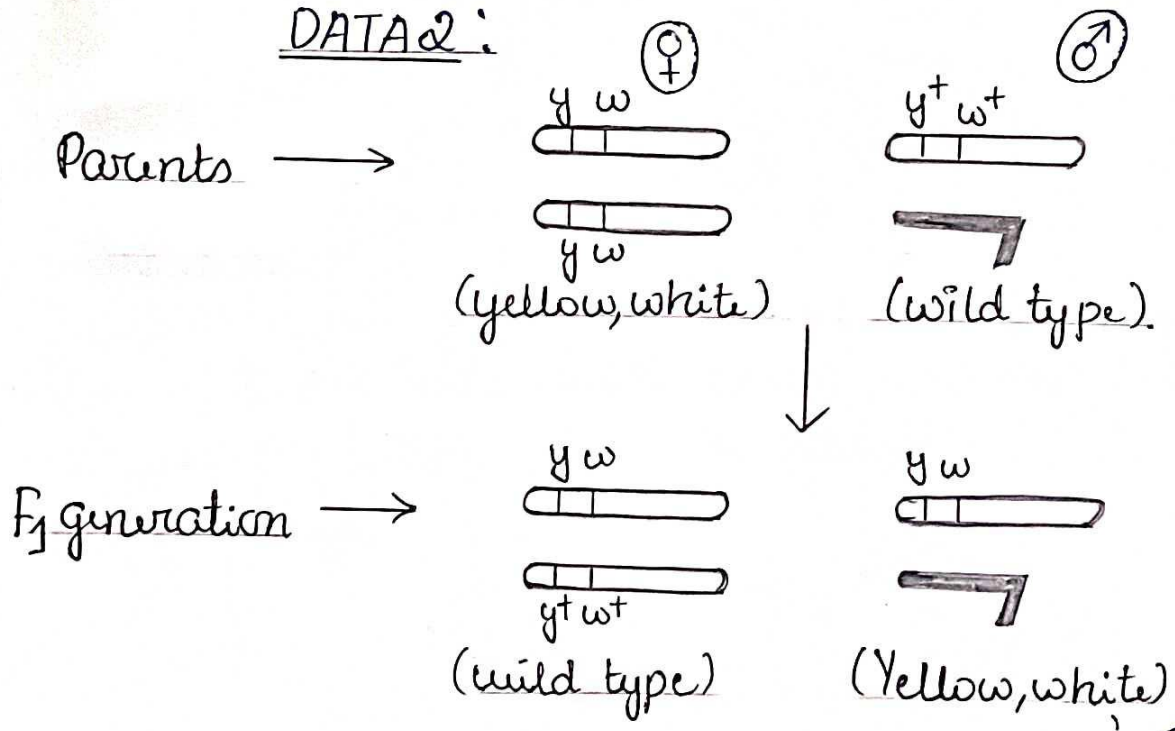
The genes for the three said characters namely eye colour, body colour and wing size are present in X-chromosome. The cross is as follows :

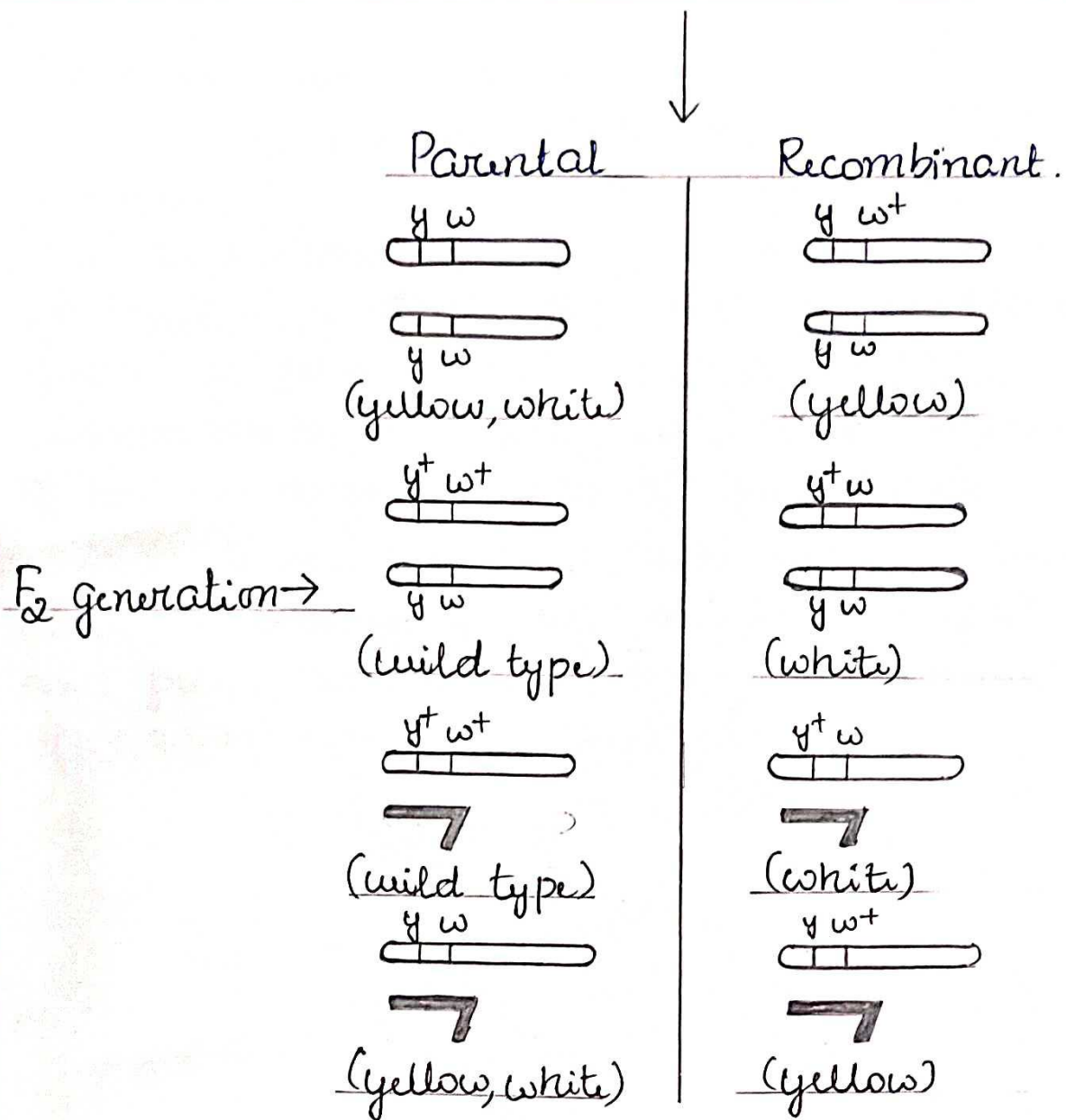
DATA 1:





However, the two genes 'w' and 'm' remain together exhibiting linkage in 62.8% of the F<sub>2</sub> offsprings. In other 37.2%, recombinant phenotype combinations are observed.





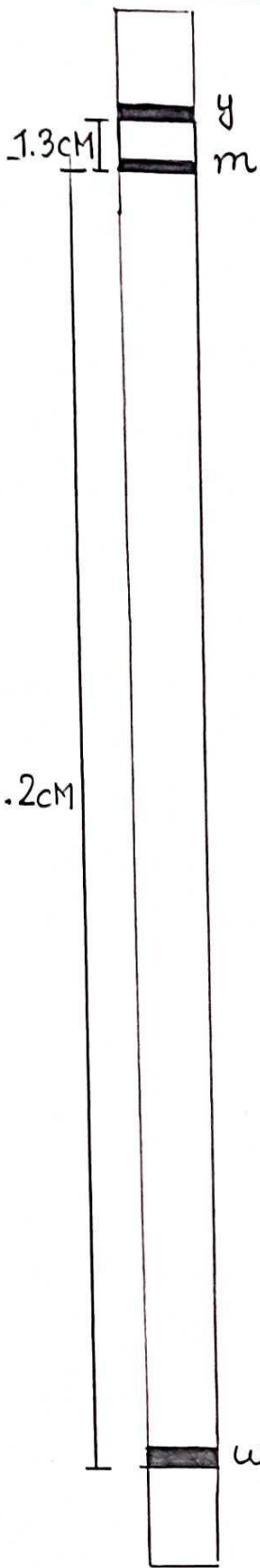
Observation -

The two genes are present on X-chromosome.  
 In  $F_2$ , 98.7% individuals exhibit parental combinations while 1.3% are recombinants..

## The linkage map:

Percentage of recombinant indicates the strength of linkage which is due to positions of the genes in the chromosome. If recombinants are less, the genes are closer. The percentage of recombinants is directly taken as a measure of the distance in units of CentiMorgan (cM).

From our first cross we find the distance between 'w' and 'm' to be 37.2 cM and from second cross we get a distance of 1.3 cM between 'y' and 'w' genes.



~~good~~

fig. Linkage map of X-chromosome of *Drosophila* showing positions of 'w', 'y' and 'm' genes.

~~15/11/21~~