

Experiment no 09: Study on sex linked inheritance in drosophila

Aim: To study on sex linked inheritance

Sex linkage:

This is an association during inheritance of a character with sex of the progeny. Sex linked is the consequence of a gene being located in the X or sex chromosome. In the early 1910, T. H. Morgan studied the inheritance pattern of White eye (w) gene in *Drosophila melanogaster* to try to disprove Mendel's theory of the 3:1 ratio

Inheritance of white eye in drosophila:

Case I

- ❖ While white eyed male was mate with red eyed female. All F₁ flies had red eyes and in F₂, 3 flies had red eyes and one had white eyes (3:1). This reveals that white eye is due to recessive gene.
- ❖ But when F₂ individuals were classified on the basics of their sex as well as eye color, all the F₂ female has red eyes, but half of the male had red and the other half had white eyes. It appears that the eye color of a fly depended on its sex.

Fig.: Sex linked inheritance of White eye (w) gene in *Drosophila melanogaster*

Case II

- ❖ But when white eyed female flies were mated with red eyed males, half the flies in F_1 were red eyed and the remaining half had white eyes. In F_2 from his reciprocal cross, red eyed and white eyed flies were obtained in a 1:1 ratio; which is same as in F_1 generation.
- ❖ The classification of F_1 and F_2 flies on the basis of their sex as well revealed that all the F_1 males were white-eye, while the female were red eyed and in F_2 both the male female flies showed the ratio 1:1 (red: white)

Conclusion:

- ❖ Thus the hypothesis shows that the W gene is located in the X-chromosome and that it has no allele in the Y-chromosome is adequate to explain the peculiar inheritance pattern of the white eye trait in drosophila.
- ❖ Female flies will have two copies of w gene (WW , Ww or ww), while male will have only one copy (W or w) i.e. hemizygous for w
- ❖ This was the first conclusive demonstration that a specific gene was located in a specific chromosome of an organism.

