

INCOMPLETE LINKAGE

There are other examples in which the particular characters do not appear together for generations but gives to new combinations. These are designated as incomplete linked genes or factors.

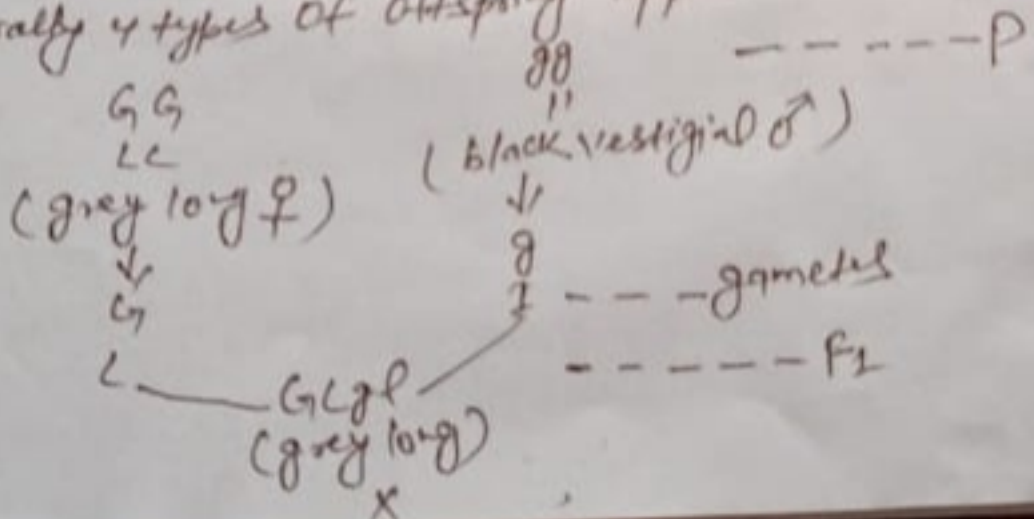
EX - If a female *Drosophila* of F_2 having grey long characteristic ($G_L g_l$) is crossed with black vestigial male ($g_l g_l$) then in F_2 four types of offspring are produced showing higher percentage of parental characters than the other types of offspring.

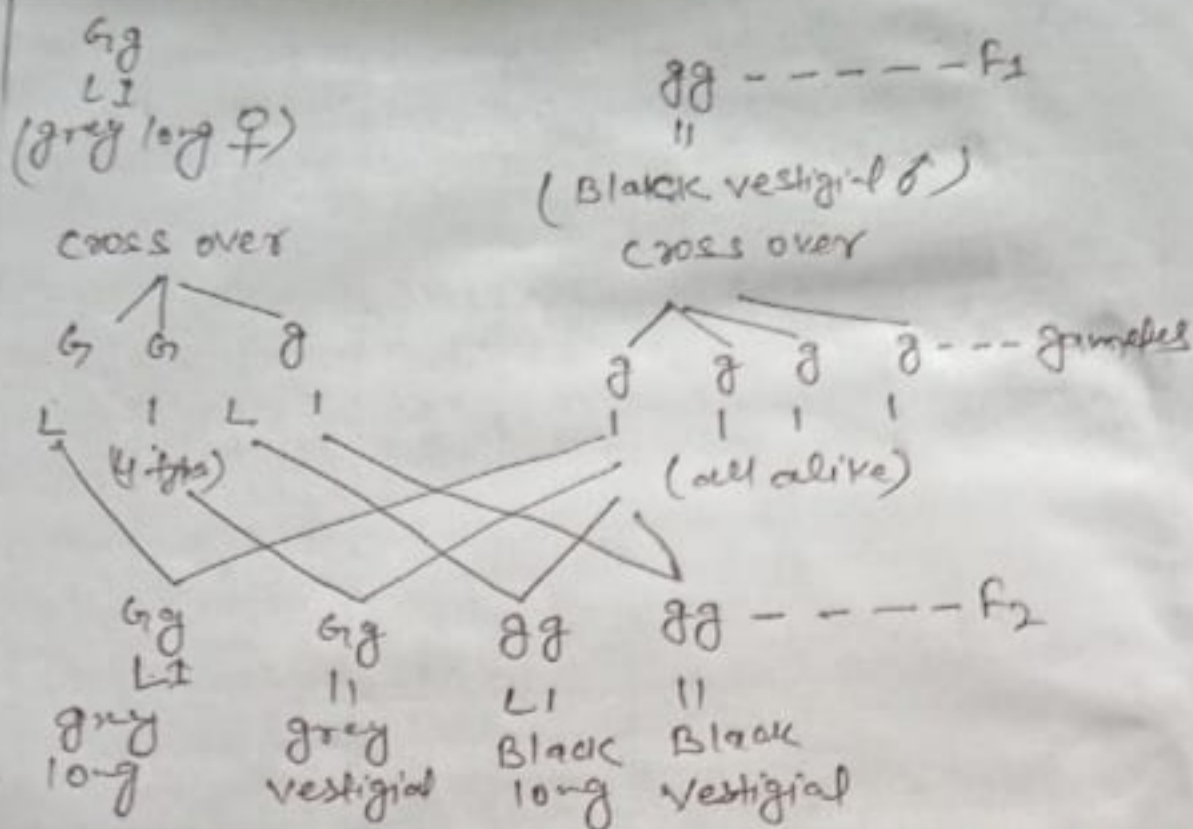
- (i) grey long 41%
- (ii) black vestigial 41%
- (iii) grey vestigial 9%
- (iv) black long 9%

The occurrence of these 4 types of offspring can be explained as follows:-

- (i) Female grey long of F_2 was heterozygous ($G_L g_l$) and male black vestigial was homozygous ($g_l g_l$).
- (ii) In female exchange of chromatid part of one with another takes place and thus form 4 types of gametes (G_L , g_l , g_L and g_l) but in homozygous male ($g_l g_l$) even if crossing over occurs there is the formation of only one type of gametes g_l .

When the sperm with g_l unites with 4 kinds of ovum naturally 4 types of offspring appear





Cross b/w grey long heterozygous female *Drosophila* and black vestigial homozygous male to show incomplete linkage.

Chromosomal Theory of Linkage

Morgan along with Castle forwarded a chromosomal theory of linkage. This was as follows:

- Linked genes are situated in the same pair of chromosomes.
- Linked genes are arranged in a linear fashion.
- Each linked gene has a constant order of arrangement.
- Strong linkage is shown by closely situated genes and vice versa.
- During inheritance the linked genes retain their original combination and are transmitted from one generation to the next generation together.
- Separation of linked genes is of rare occurrence.
- Strength of linkage is inversely proportional to the distance b/w linked genes.