Dihybridism

Dihybridism refers to a cross between two distinct lines that differ in two observed traits. According to Mendel's law of independent assortment, genes for different traits can segregate independently during the formation of gametes. This applies only to genes localized on discrete chromosomes (or genes localized at great distance on the same chromosome - see linkage) .

The parental (P) generation crosses are either **AABB x aabb** or **AAbb x aaBB**. In both these examples, there is a crossing between dominant homozygote and recessive homozygote for each gene. The offspring (the first filial generation - F1) of either of these crosses is uniform and heterozygous for both genes – **AaBb**.

In second filial generation (F2), Mendel identified phenotypic segregation ratio: (3/4 + 1/4) x (3/4 + 1/4) = 9:3:3:1. There are 9/16 subjects with both dominant phenotypes, 6/16 (3/16+3/16) subjects with one dominant and one recessive phenotype and 1/16 subjects with both recessive phenotypes. The segregation ratio for **backcross** (F1xP) **is 1:1:1:1**.

For estimating the number of phenotypes present in F2, a good rule of thumb is 2^n where n represents number of genes. Similarly, the number of genotypes in F2 is 3^n. Phenotypic segregation ratio in F2 is counted as $(3/4 + 1/4)^n$ or $(1/2 + 1/2)^n$ when backcrossing.