

Int 2 Biology - Unit 2 Environmental Biology & Genetics

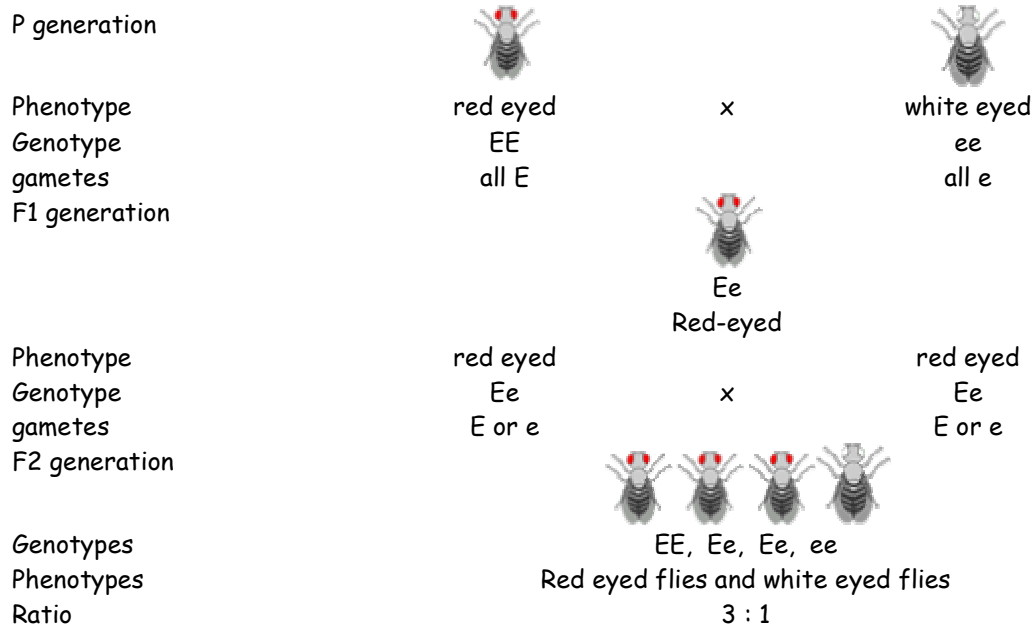
Revision Notes for Chapter 9 - Genotype and Phenotype

Terms You Should Know

<u>Term</u>	<u>Meaning</u>
Genotype	The set of genes possessed by an organism (e.g. EE, Ee or ee)
Phenotype	The physical characteristics of an organism (e.g. blue-eyed or brown-eyed)
Alleles	The different forms of a gene. For example the gene for eye colour has two alleles - blue-eyed or brown-eyed.
Homozygous	An individual who has two alleles the same (e.g. DD, ff, RR, tt).
Heterozygous	An individual who has two different alleles (e.g. Dd, Ff, Rr, Tt).
Dominant	The allele which is stronger. This is represented with a capital letter (e.g. A, D, F, R). Dominant alleles always control the phenotype when they are present.
Recessive	The allele which is weaker. This is represented with a capital letter (e.g. a, d, f, r). Recessive alleles are masked unless there are two copies present.
Co-dominant	Results when the alleles have the same strength - they are equally strong with no one allele being either dominant or recessive.
True-breeding	A type of monohybrid cross in which a homozygous recessive individual is bred with a homozygous dominant individual.
P	Symbol representing the parents in the monohybrid cross.
F ₁	Symbol representing the offspring of the P generation.
F ₂	Symbol representing the offspring produced when two members of the of the F ₁ generation are bred together.







Monohybrid Cross

A monohybrid cross involves crossing two individuals who are different for one particular characteristic. For example consider crossing a red-eyed fruit fly with a white-eyed fruit fly. In this example E = red-eyed allele and e = white-eyed allele.



Monohybrid Cross with co-dominant alleles

Co-dominance results when the alleles have the same strength. In this case a heterozygous individual has a phenotype midway between that of two true breeding strains. Consider the cross of a black hen with a white hen, where the in between form is called speckled. In this example W = the white allele and B = the Black allele.

P generation					
Phenotype	Black	x	White		
Genotype	BB		WW		
gametes	all B		all W		
F1 generation					
		BW			
		Speckled			
Phenotype	Speckled		Speckled		
Genotype	BW	x	BW		
gametes	B or W		B or W		
F2 generation					
Genotypes		BB, BW, BW, WW			
Phenotypes		Black, Speckled and White			
Ratio		1 : 2 : 1			

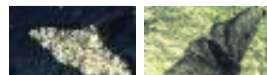
The expected and actual ratios in a monohybrid cross may differ.
This is because **FERTILISATION IS A RANDOM PROCESS**.

Some inheritance is **polygenic** - this means that there are several genes involved (e.g height)

Environmental Impact on Genotype

The environment and genotype interact to make the final appearance of an organism (e.g. humans grow taller this century due to better food & medicine). These effects are not passed on to offspring.

Natural Selection - "Survival of the Fittest"



Organisms that are better adapted to their environment survive and breed, while those less well adapted die. The better-adapted organisms are more likely to pass their characteristics to succeeding generations. Over many generations the species will change, becoming better adapted to its environment. An example is the peppered moth. The peppered (light) form is more common in unpolluted areas where it is well camouflaged on lichen covered tree bark. The melanic (black) form on the right is better camouflaged on soot blackened tree bark in polluted areas.