

Edexcel (B) Biology A-level

8.3 - Gene pools

Flashcards

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Define population.



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All the organisms of a particular species that live in the same place.



Give examples of selection pressures.



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- Predation
- Disease
- Competition (for food, habitats, mates)
- Environmental conditions e.g.
temperature



How do selection pressures change allele frequencies within a population?



How do selection pressures change allele frequencies within a population?

Organisms with advantageous characteristics are more likely to survive and produce offspring. Therefore their favourable alleles get passed on, while unfavourable alleles die out.



What is stabilising selection?



What is stabilising selection?

Occurs when environmental conditions stay the same. Individuals closest to the mean are favoured, and any new characteristics are selected against. Results in low diversity.



What is disruptive selection?



What is disruptive selection?

The opposite of stabilising selection, in that both extremes of the normal distribution are favoured over the mean. Over time, the population becomes phenotypically divided and new species may develop.



Define genetic drift.



Define genetic drift.

A change in a population's allele frequencies that occurs due to chance rather than selective pressures. In other words, it is caused by 'sampling error' during reproduction.



What is meant by a population bottleneck?



What is meant by a population bottleneck?

Where a catastrophic event dramatically reduces the size of a population, thereby decreasing the variety of alleles in the gene pool and causing large changes in allele frequencies.



What is meant by the founder effect?



What is meant by the founder effect?

When a small number of individuals become isolated, forming a new population with a limited gene pool, with allele frequencies not reflective of the original population.



What is the Hardy-Weinberg principle?



What is the Hardy-Weinberg principle?

Allows us to estimate the frequency of alleles in a population, as well as if allele frequency is changing over time.



Give the assumptions made by the Hardy-Weinberg principle.



Give the assumptions made by the Hardy-Weinberg principle.

- No mutations occur to create new alleles.
- No migration in or out of the population.
- No selection, so alleles are all equally passed on to the next generation.
- Random mating.
- Large population.



Explain the Hardy-Weinberg equation for calculating allele frequency.



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The frequencies of each allele for a characteristic must add up to 1.0. The equation is therefore; $p + q = 1$

Where p = frequency of the dominant allele, and q = frequency of the recessive allele.



Explain the Hardy-Weinberg equation for calculating genotype frequency.



Explain the Hardy-Weinberg equation for calculating genotype frequency.

The frequencies of each genotype for a characteristic must add up to 1.0. The equation is therefore; $p^2 + 2pq + q^2 = 1$

Where p^2 = frequency of homozygous dominant, $2pq$ = frequency of heterozygous, and q^2 = frequency of homozygous recessive.

