

Edexcel IAL Biology A-level

4.19-4.21 - Populations and Conservation

Flashcards

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Define niche



Define niche

Describes how an organism 'fits' into an ecosystem and its role in that environment



What is an adaptation?



What is an adaptation?

A feature of an organism that increases its chance of survival in its environment



Describe the three types of adaptation



Describe the three types of adaptation

- **Anatomical** - changes to physical features
- **Physiological** - changes to bodily processes
- **Behavioural** - changes to actions



What is the Hardy-Weinberg equation used for?



What is the Hardy-Weinberg equation used for?

The Hardy-Weinberg equation is used to determine whether there is a change in allele frequency over time in a population



What is the Hardy-Weinberg equation?



What is the Hardy-Weinberg equation?

$$p^2 + 2pq + q^2 = 1$$

p^2 = Frequency of homozygous dominant

$2pq$ = Frequency of heterozygous

q^2 = Frequency of homozygous recessive



What causes a change in allele frequencies over time?



What causes a change in allele frequencies over time?

Mutations in genes which cause natural selection can cause a change in allele frequencies over time as selectively advantageous alleles become more common



Why does natural selection occur?



Why does natural selection occur?

1. Predation
2. Disease
3. Competition

All result in differential survival and reproduction



What is evolution?



What is evolution?

Change in allele frequency in gene pool of a population. Results in development of new dominant characteristics



How does natural selection lead to evolution?



How does natural selection lead to evolution?

- Random mutations result in new alleles
- Some alleles provide an advantage, making an individual more likely to survive and reproduce
- Offspring receive the new allele & frequency increases over many generations. Frequency of unfavourable alleles decreases



Define speciation



Define speciation.

When a population is split and reproductively isolated, there are different selective pressures on the two groups. If the genetic makeup changes to the extent the two groups can no longer interbreed, they have become separate species



What is meant by allopatric speciation?



What is meant by allopatric speciation?

Speciation resulting from a physical barrier e.g. river, mountain range. The environments occupied by the two groups are different, and therefore different alleles are favoured



What is meant by sympatric speciation?



What is meant by sympatric speciation?

Speciation resulting from a non-physical barrier e.g. a mutation that no longer allows two organisms to produce fertile offspring. Any changes in anatomy or behaviour may also prevent breeding



What is conservation?



What is conservation?

The maintenance of ecosystems and biodiversity by humans in order to preserve the Earth's resources



Describe what is meant by an
endangered species



Describe what is meant by an endangered species.

A species that, due to a loss of habitat or rapid decrease in population numbers, is at risk of extinction



Describe how conservation can be achieved



Describe how conservation can be achieved

- **Protection of habitats**, e.g. nature reserves, national parks, SSSIs
- **Protection of endangered species**, e.g. making hunting illegal, breeding programmes increase population size
- **International cooperation**, e.g. restricting trade of endangered species and their parts
- **Species reintroduction**
- **Gene and sperm banks**
- **Seed banks**



Why is the conservation of gene pools important?



Why is the conservation of gene pools important?

- Many plant species are yet to be discovered and may contain chemicals that could be used in **future medicines**
- Protection of potential **future food sources**
- Some alleles may provide **selective advantages**, preventing extinction
- Each species and its genes are precious



What is in-situ conservation?



What is in-situ conservation?

Conservation of organisms and the surrounding area within their natural habitat using methods such as protected habitats



What are the advantages of in-situ conservation methods?



What are the advantages of in-situ conservation methods?

- The whole habitat and environment can be conserved rather than just a specific species
- Organisms can interact with their natural environment and occupy their appropriate ecological niche
- More organisms can be conserved at the same time as there are less spatial restrictions
- It is typically cheaper to set up in-situ conservation sites than ex-situ conservation sites



What are the disadvantages of in-situ conservation methods?



What are the disadvantages of in-situ conservation methods?

- Conservation may be harder as certain factors which were threatening the populations are likely to still be present
- It is often difficult to devote large portions of land to conservation where land is needed for growing populations



What is ex-situ conservation?



What is ex-situ conservation?

Conservation of organisms away from their natural habitat such as in zoos or seed banks



What are the advantages of ex-situ conservation methods?



What are the advantages of ex-situ conservation methods?

- Predation and natural threats to the population are eliminated
- Some ex-situ conservation sites can bring in money from tourism to help cover conservation costs
- Ex-situ conservation sites can be used for education
- Close monitoring and scientific investigations are much easier as there are fewer uncontrolled variables
- The health of the organisms can be monitored closely and medical care can be given much more easily



What are the disadvantages of ex-situ conservation methods?



What are the disadvantages of ex-situ conservation methods?

- Reintroduction into their natural habitat may be difficult as the animals will not be used to the environment and may be less likely to survive
- Genetic diversity will be significantly lowered in captive populations
- Ex-situ sites are expensive to establish and maintain
- Animals may behave differently which might make breeding programmes difficult

