ADVANCED BIOLOGY: THE EVOLUTION OF POPULATIONS

(USE CHAPTER 23 AS A RESOURCE)

Microevolution

GENETIC VARIATION MAKES EVOLUTION POSSIBLE

1. Genetic Variation
2. Sources of Genetic Variation
3. Formation of New Alleles
4. Altering Gene Number or Position
5. Rapid Reproduction
6. Sexual Reproduction

THE HARDY-WEINBERG EQUATION CAN BE USED TO TEST WHETHER A POPULATION IS EVOLVING

1. Gene Pools and Allele Frequencies
2. Population
3. Gene pool
4. Example of frequency of alleles

|  |  |  |  |
| --- | --- | --- | --- |
| Color of flower | Red Flowers | Pink Flowers | White Flowers |
| Genotype | RR | RW | WW |
| Number of flowers | 320 | 160 | 20 |

1. How many R alleles in the population and what is the frequency of R (p)?
2. How many W Alleles in the population and what is the frequency of W (q)?
3. p + q = 1
4. The Hardy-Weinberg Principle
5. Hardy-Weinberg Equilibrium (Application)

Use the calculated p and q from above to calculate genotype frequencies

1. Probability of RR
2. Probability of RW
3. Probability of WW
4. What does this mean?
5. Conditions for Hardy-Weinberg Equilibrium

(1)

(2)

(3)

(4)

(5)

1. Applying the Hardy-Weinberg Principle (PKU as an example)

The probability of a child with PKU is 1/10000

NATURAL SELECTION, GENETIC DRIFT, AND GENE FLOW CAN ALTER ALLELE FREQUENCIES IN A POPULATION

1. Natural Selection
2. Genetic Drift
3. The Founder Effect
4. The Bottleneck Effect
5. Effects of Genetic Drift: A Summary

(1)

(2)

(3)

(4)

1. Gene Flow

NATURAL SELECTION IS THE ONLY MECHANISM THAT CONSISTENTLY CAUSES ADAPTIVE EVOLUTION

Adaptive Evolution

1. Natural Selection: A Closer Look
2. Relative Fitness
3. Directional, Disruptive, and Stabilizing Selection



1. Directional
2. Disruptive
3. Stabilizing
4. The Key Role of Natural Selection in Adaptive Evolution
5. Sexual Selection
6. Sexual dimorphism
7. Intrasexual selection
8. Intersexual selection
9. The Preservation of Genetic Variation

Neutral variation

1. Diploidy
2. Balancing Selection
3. Heterozygote Advantage
4. Frequency-Dependent Selection
5. Why Natural Selection Cannot Fashion Perfect Organisms

a.

b.

c.

d.