

4.3 Genetic Drift

Genetic drift is a process that causes changes in the genetic makeup of a population by chance. It is one of the mechanisms of evolution. Genetic drift mainly affects small populations because random events can easily change the frequency of genes.

1. Definition of Genetic Drift

Genetic drift is the random change in allele frequency within a population from one generation to another. Unlike natural selection, genetic drift happens by chance and not because organisms are better adapted.

2. How Genetic Drift Occurs

In every population, some individuals survive and reproduce while others do not. Sometimes these changes happen due to random events such as accidents, diseases, natural disasters, or migration. When certain individuals die or fail to reproduce by chance, some genes may become more common while others may disappear completely.

3. Features of Genetic Drift

Occurs by chance. More common in small populations. Can reduce genetic variation. May cause some alleles to disappear completely. Does not always improve adaptation.

4. Types of Genetic Drift

There are two major types of genetic drift.

A. Bottleneck Effect

The bottleneck effect occurs when a large population is suddenly reduced in size because of natural disasters, disease, drought, or other events. Only a few individuals survive, and the surviving population may have less genetic variation. **Example:** If a flood kills most animals in a population, the remaining survivors may carry only a few of the original genes.

B. Founder Effect

The founder effect occurs when a small group of individuals leaves a large population and starts a new population in another place. The new population may have different allele frequencies from the original population. **Example:** A few birds blown by a storm to an island may start a new population with limited genetic diversity.

5. Effects of Genetic Drift

Genetic drift can have several effects on populations: Reduction of genetic diversity. Loss of useful alleles. Increase in harmful alleles. Formation of new populations with different characteristics. Contribution to evolution over time.

6. Difference Between Genetic Drift and Natural Selection

Genetic drift: Changes occur by chance. **Natural selection:** Changes occur because favorable traits improve survival. **Genetic drift:** More important in small populations. **Natural selection:** Works in all populations.

Summary

Genetic drift is a random change in allele frequency in populations. It is most common in small populations and may reduce genetic variation. The two major types of genetic drift are the bottleneck effect and the founder effect.

Summary Questions and Answers

1. What is genetic drift?

Genetic drift is the random change in allele frequency in a population.

2. Why does genetic drift affect small populations more?

Because random events can easily change allele frequencies in small populations.

3. What is the bottleneck effect?

The bottleneck effect happens when a population size is suddenly reduced by disasters or diseases.

4. What is the founder effect?

The founder effect occurs when a small group starts a new population.

5. How does genetic drift reduce genetic variation?

Some alleles may disappear completely due to random events.

6. What is one difference between genetic drift and natural selection?

Genetic drift occurs by chance, while natural selection favors useful traits.

7. Why is genetic drift important in evolution?

It changes allele frequencies and contributes to evolutionary change over time.