Genetic Drift

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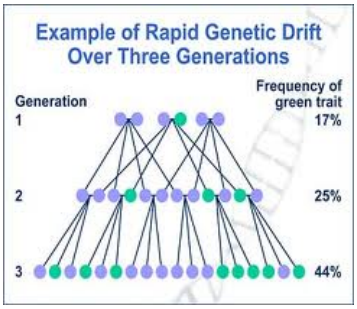
The concept of Genetic Drift

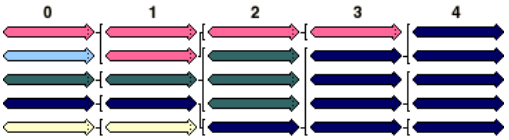
The concept for genetic drift was first introduced by one of the founders in the field of population genetics, Sewall Wright. His first use of the term "drift" was in 1929.



Genetic drift is one of the basic mechanisms of evolution. It is the change in the frequency of an allele in a population due to random sampling. Genetic drift may cause gene variants to disappear completely, and thereby reduce genetic variation. Genetic drift affects the genetic makeup of the population but, unlike natural selection, through an entirely random process.
Genetic drift is just change in allelic frequency due to random mutations. These changes are not influenced by an organism's environment.

Random genetic drift

Genetic drift is the random nature of transmitting alleles to the offspring. This won't be effective in a large population and the effect could not be rapid and significant because the random nature of the process will tend to average out. Genetic drift adds a randomizing element to genetic diversity in a species. It must have played a major role in the early stages ofhuman evolution when our populations were very small.



When genetic drift is introduced into the model, the results are different: Effect of genetic drift in the population of worms given here.

Genetic Drift in the population of worms

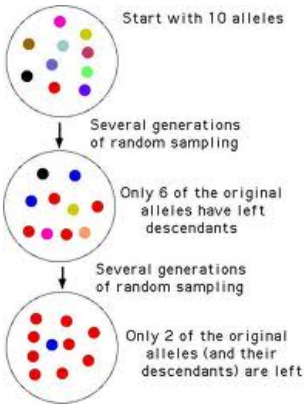
In generation 2, the pink worm produces 1 offspring, the 3 green worms produced none, and the dark blue worm produced 4.

Genetic Drift Vs Natural selection

Genetic drift:

- Has no direction
- Guided only by the mathematics of chance.
- Acts upon the genotypic frequencies within a population without regard to their phenotypic effects.

Natural selection:



- Has a direction
- guiding evolution towards heritable adaptations to the current environment
- Favors the spread of alleles whose phenotypic effects increase survival and/or reproduction of their carriers.
- Selection lowers the frequencies of alleles that cause unfavorable traits, and ignores those that are neutral

The Founder Effect

- Special case of genetic drift
- When very few members of a population migrate to form a separate new population, the founder effect occurs. For a period after the foundation, the small population experiences intensive drift.
- The number of alleles for some genes in the original population is larger than the number of gene copies in the founders.
- Founders can strongly affect the population's genetic make-up far into the future when a newly formed colony is small.

Population size decides the drift and selection. Drift is more important in small populations. Most species consist of numerous smaller inbreeding populations called "demes". Drift is a major mechanism of evolution. Neutralist-selectionist debate over the importance of neutral mutations is one of the major controversies still.

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Reference Links:

- http://en.wikipedia.org/wiki/Genetic_drift#Genetic_drift_versus_natural_selection
- http://evolution.berkeley.edu/evosite/evo101/IIIDGeneticdrift.shtml
- http://www.talkorigins.org/faqs/genetic-drift.html
- http://www.biology.arizona.edu/evolution/act/drift/drift.html

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