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Principles of Agricultural Science – Plant

The Power of Change

Unit 7 – Plant Reproduction
Lesson 7.5 Evolutionary Ideas

What is evolution?

- Change in the gene pool of a population from generation to generation by such processes as mutation, natural selection, and genetic drift.

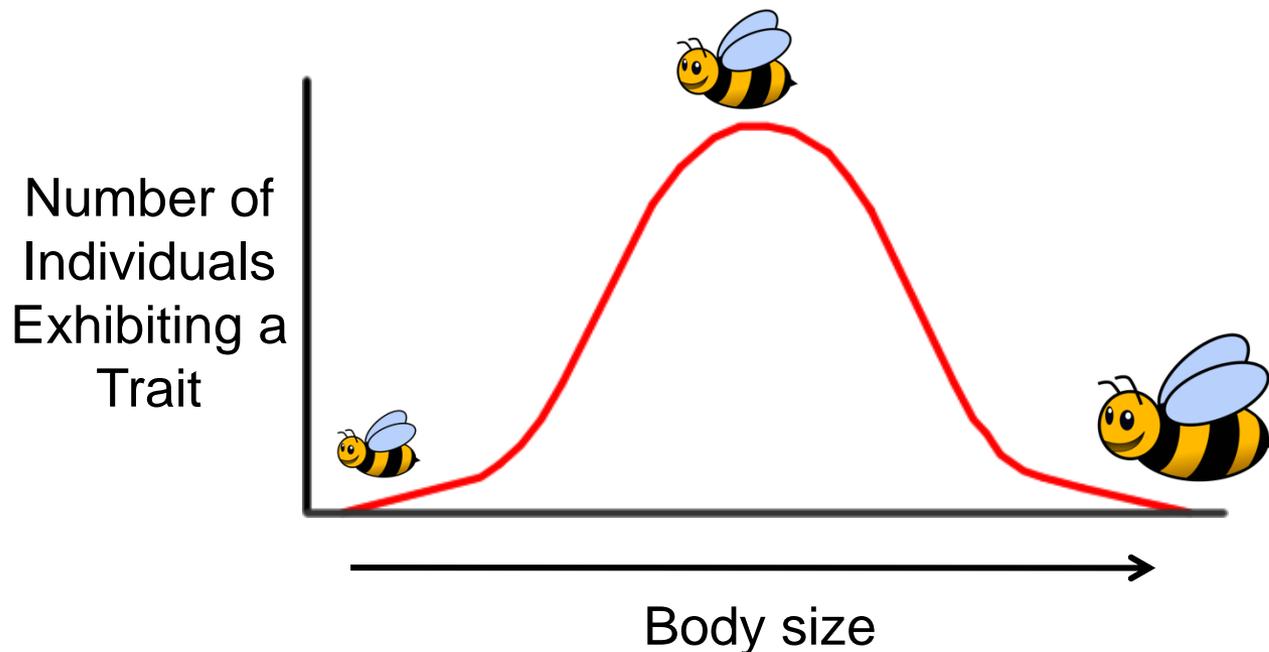- Simply put:
  - Change over time

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Why evolve?

- Environmental conditions – become better-suited to live in a specific environment or a variety of environments

- Adaptation – process of an inherited trait that increases an organism's chance of survival in a particular environment

Evolution = Genetic Shifts

- Mutation – spontaneous changes in DNA makeup

- Migration – plants moving from one population to another

- Population size – group size limits reproduction possibilities

- Random mating – no sexual selection

- Selection – no environmental influences or preferences

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No Evolution = Genetic Equilibrium

Most individuals will exhibit the average trait. Phenotypes in a population tend to remain the same from generation to generation.

Number of Individuals Exhibiting a Trait

Body size

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Charles Darwin

- Scientist credited with evolutionary theory
- Two theories:
  - **Descent with modification** (evolution) – newer forms in fossil record are modified descendents of older species
 - **Modification by natural selection** – how evolution occurs

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Natural Selection

- Organisms best suited to their environment reproduce more successfully than other organisms

Survival of the Fittest

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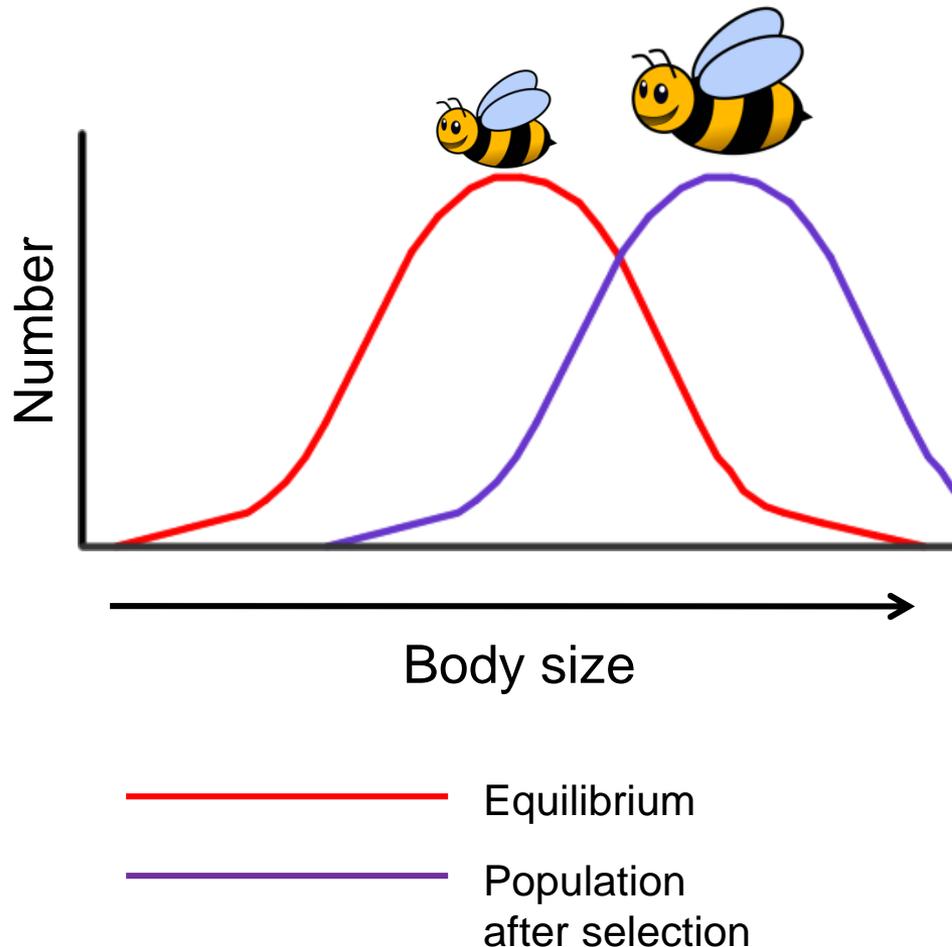
Stabilizing Selection

- The average has the greatest chance of survival

- Subsequent generations have fewer extreme alleles

Number of Individuals

Equilibrium

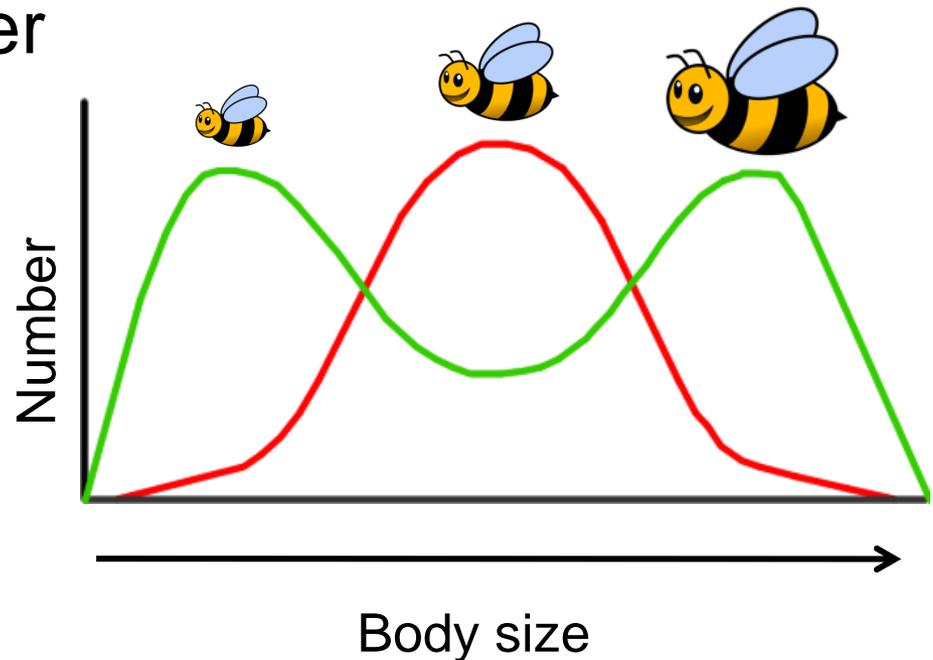Population after selection

Body size
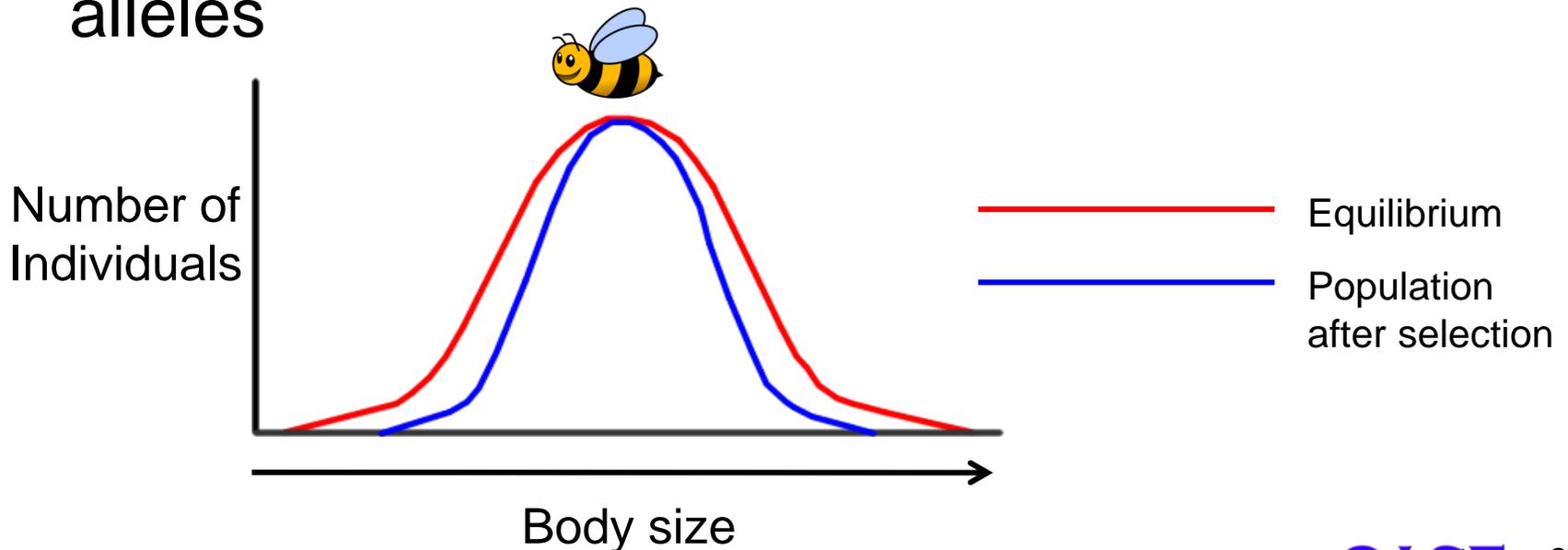
Directional Selection

- An extreme trait gives an organism a better chance of survival and reproduction.

- More organisms with that trait are in each subsequent generation.

Body size

Number

Equilibrium

Population after selection

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Disruptive Selection

- Organisms with either extreme trait have a better chance of survival than the average.

Number

Body size

—— Equilibrium

—— Population after selection

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Sexual Selection

- Reproductive efficiency based on coloration of flowers or other anatomical features

- Desired traits = greater reproductive success

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Isolation

- Similar species that adapt to different environments become less similar

Geographic

Species separated by a geographic feature evolve to fit the environment

Reproductive

Reproductive seasons of species change until they are no longer compatible

References

Dictionary.com. (2011). *Dictionary.com unabridged (v 1.1)*. Retrieved from: **http://dictionary.reference.com/browse/**

Feldkamp, S. (Ed.). (2002). *Modern biology*. Austin, TX: Holt, Rinehart, and Winston.

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