

Evolution for Ecology

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Section 1: Evolution and Ecology are Intertwined

Three examples demonstrate that evolution can happen rapidly enough to alter ecological interactions while we are watching. There are many more documented cases of rapid evolution.

- Two Processes Occurring Together
- Rapid Evolution of Resistance in a Crop Pest
- Exercise: Evolving Resistance in Pink Bollworms
- Rapid Evolution of Links in the Food Chain
- Exercise: Sticklebacks Evolve
- Video: Mechanisms of Evolution
- Evolution of Invasive Species
- Section Summary
- Ask Your Instructor

Section 2: The Logic of Evolution by Natural Selection

When three conditions hold, populations automatically change across generations. These conditions are broadly prevalent, making natural selection a universally applicable process.

- Sticklebacks and Charles Darwin
- Requirement 1: Individuals Vary
- Requirement 2: Variation is Heritable
- Requirement 3: Survival and Reproduction are Selective
- The Consequence: Change Across Generations
- Big Picture: Natural Selection is Universally Applicable
- Section Summary
- Ask Your Instructor

Section 3: Genetics and Evolution

The modern version of evolution by natural selection incorporates Mendelian genetics. Evolution can be defined as change in allele frequencies. Natural selection is not the only mechanism of evolution.

- In the Language of Genetics
- The Genetics of Stickleback Armor
- Genotype and Allele Frequencies
- Evolution as Change in Allele Frequencies
- Local Adaptation and Trade-offs Are Common
- Genetic Drift Is a Mechanism of Evolution
- Video: Natural Selection vs. Genetic Drift
- Migration Is a Mechanism of Evolution
- Mutation Is a Mechanism of Evolution
- Section Summary
- Ask Your Instructor

Section 4: Managing the Evolution of Resistance

Understanding evolution can help us solve a practical ecological problem.

- Pink Bollworms and Genetic Engineering
- Managing a Bollworm Infestation

- Why Does Mixed Planting Work?
- Antibiotic Resistance
- The Evolution of Resistance Is Evolution of a Trait
- Section Summary
- Ask Your Instructor