

# Evolutionary processes

Analyzing genotype frequencies

Types of natural selection

Other evolutionary mechanisms

Mating patterns

# Evolution by natural selection

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# Outline

Analyzing genotype frequencies

Types of natural selection

- Trait level

- Allele level

Other evolutionary mechanisms

- Genetic drift

- Gene flow

- Mutation

Mating patterns

- Inbreeding

- Sexual selection

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# ABO Blood groups

**TABLE 20.1** The ABO Blood Group.

PHENOTYPE	GENOTYPE
A	<i>AA</i> or <i>AO</i>
B	<i>BB</i> or <i>BO</i>
AB	<i>AB</i>
O	<i>OO</i>

**Table 20.1**

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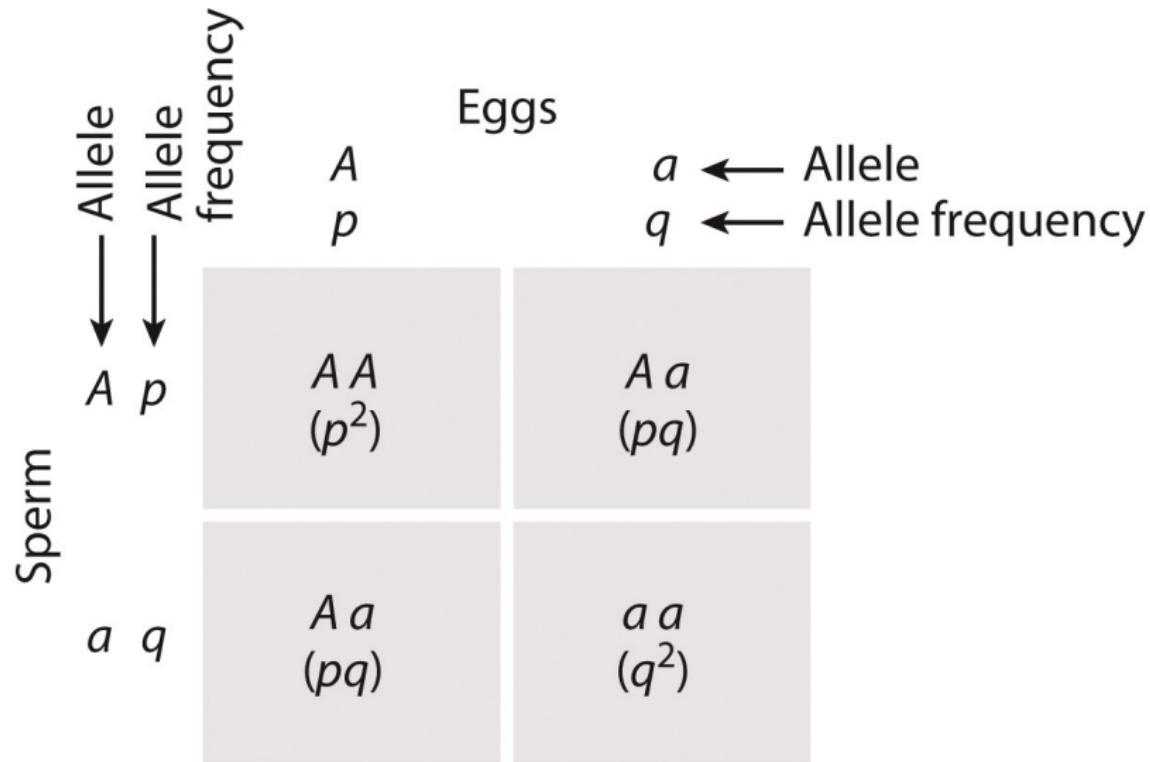
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Allele level

Other evolutionary mechanisms

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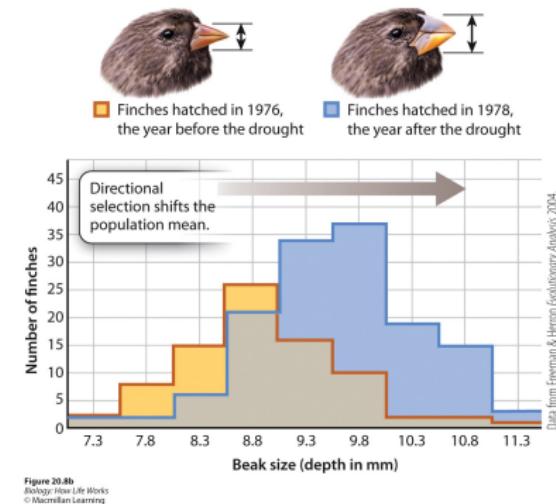
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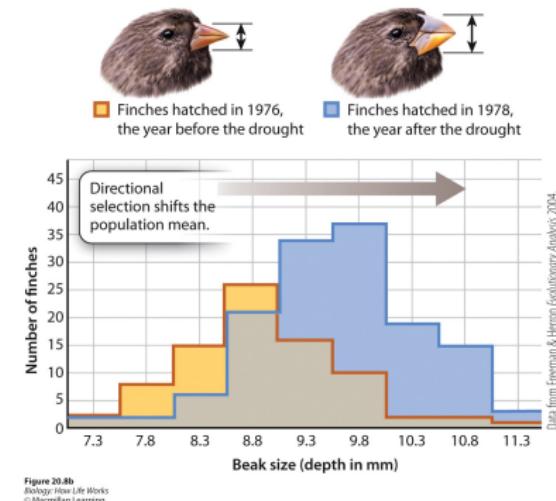


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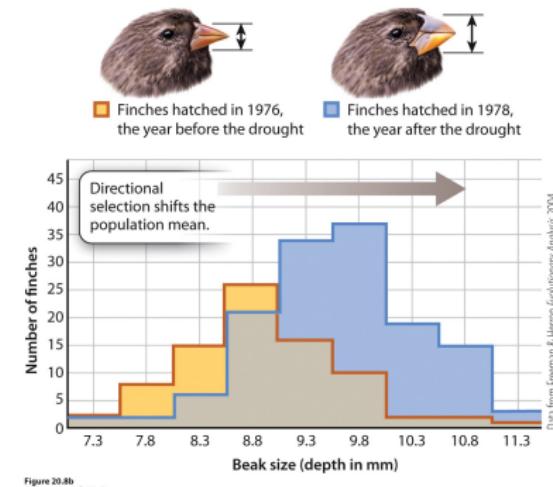
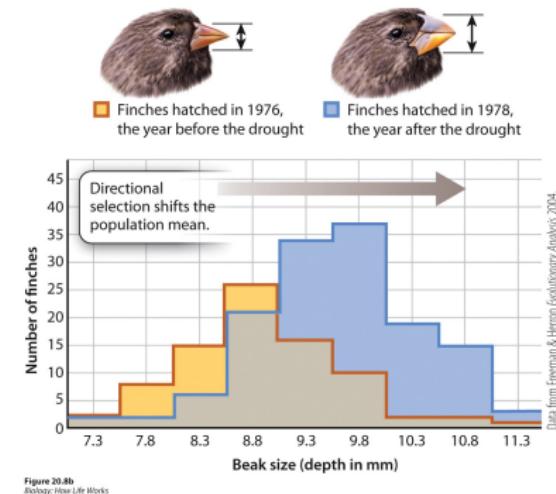


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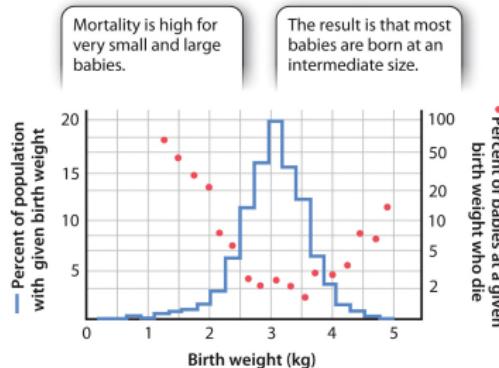
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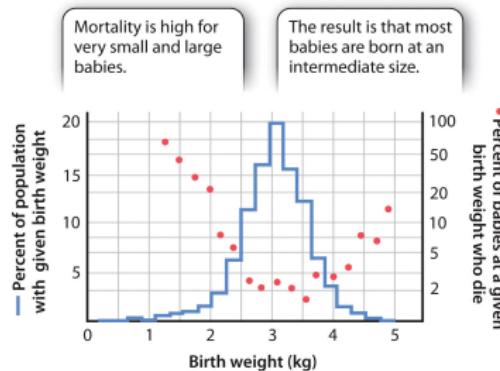
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C. W. U. (www.uw.edu), L. J. G. (www.ljg.net), M. B. (www.marcusblum.com), M. S. (www.marcusstrelak.com),

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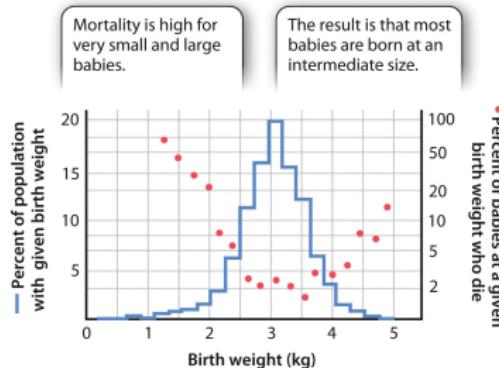
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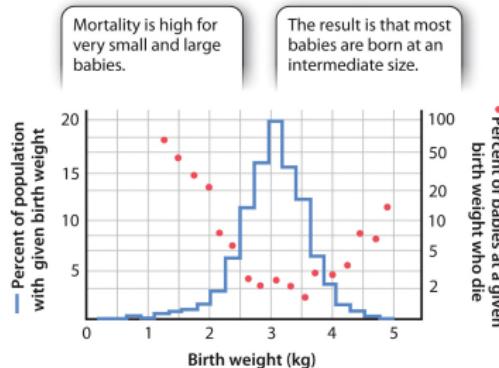


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## Connections between selection types

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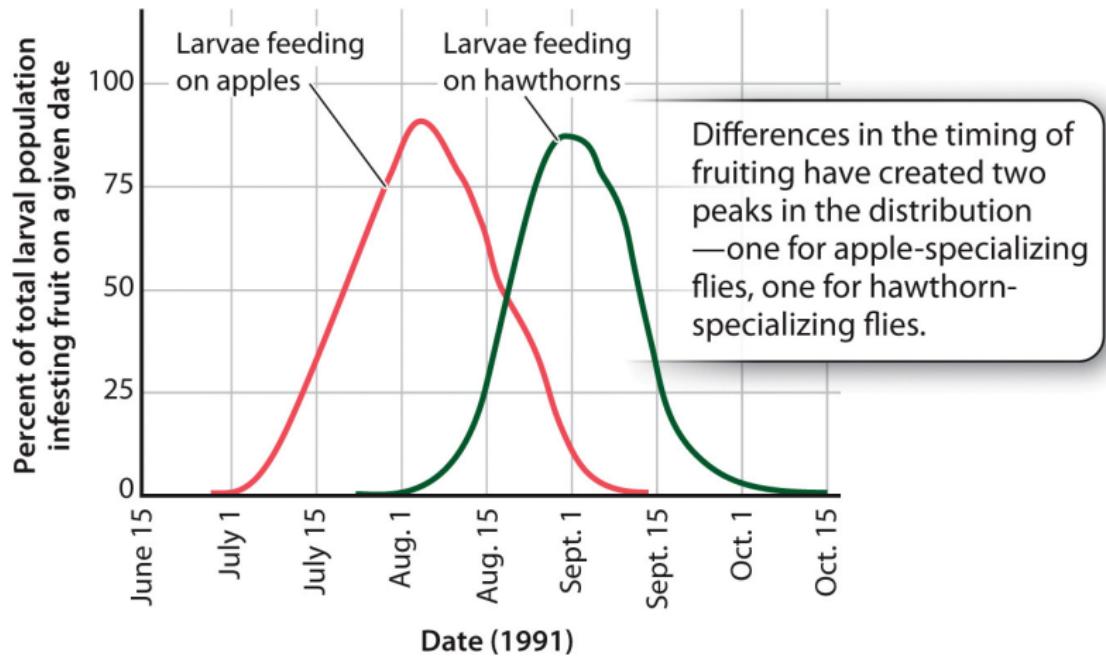
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**Figure 20.9b**  
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Data from Filchak et al. 2000 *Nature* 407:739–742.

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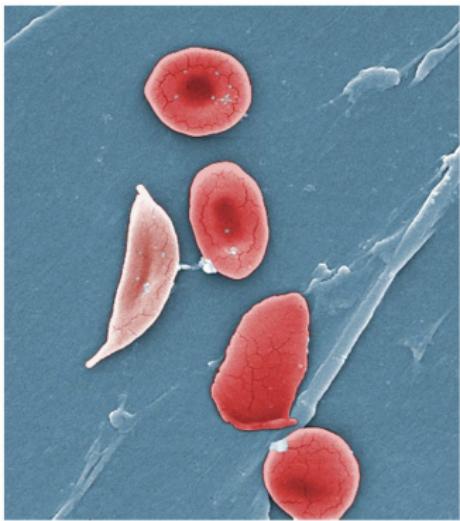
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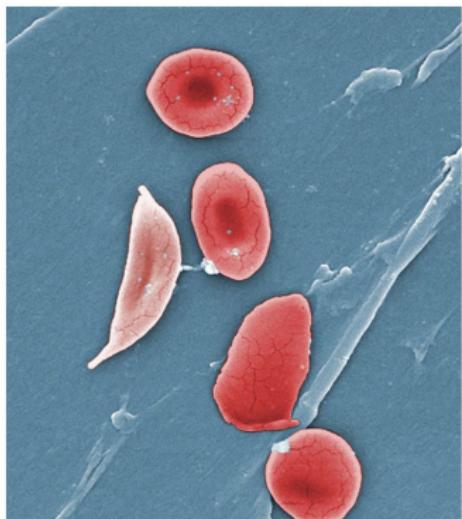
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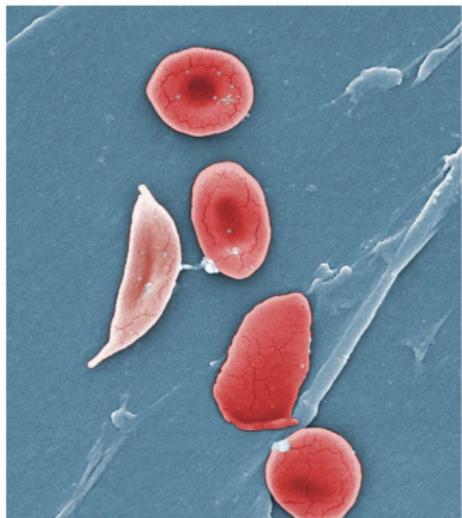
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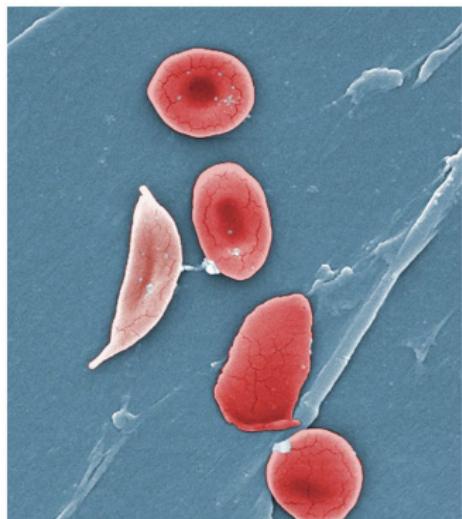
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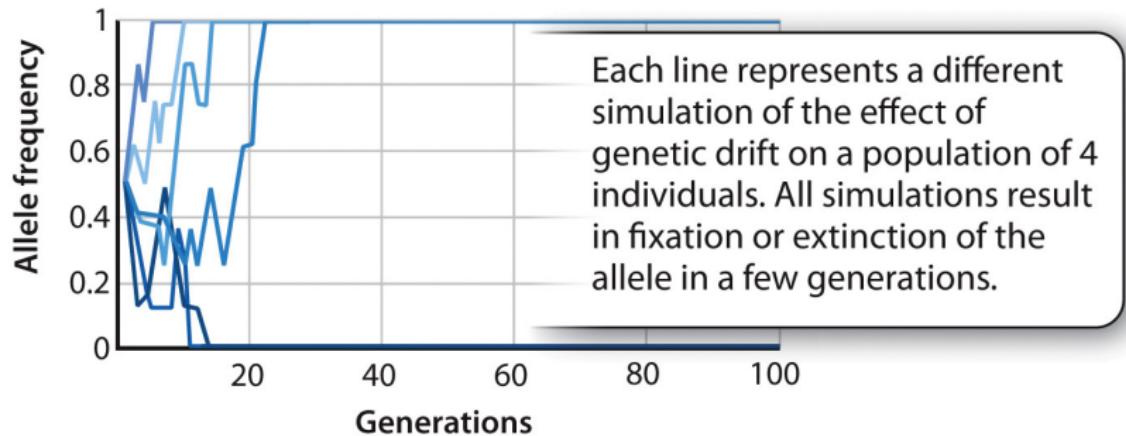
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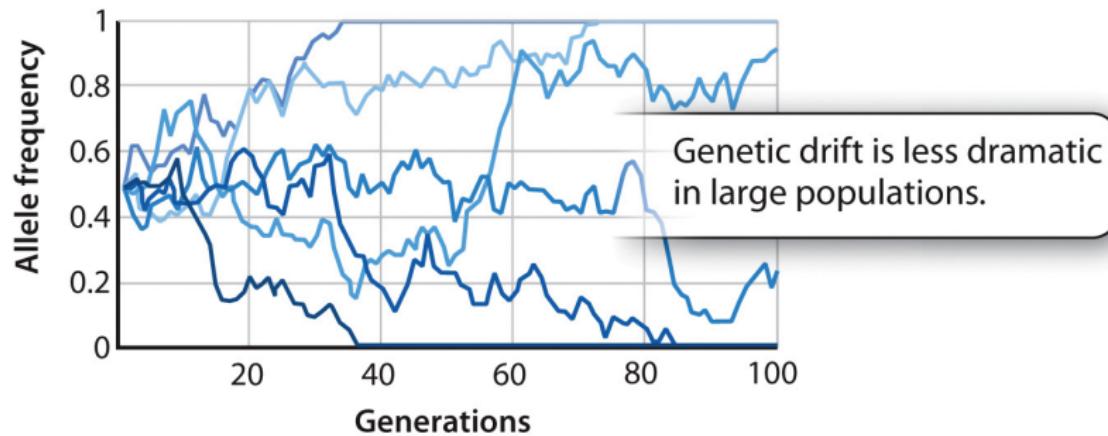
Population size = 4



**Figure 20.13b**  
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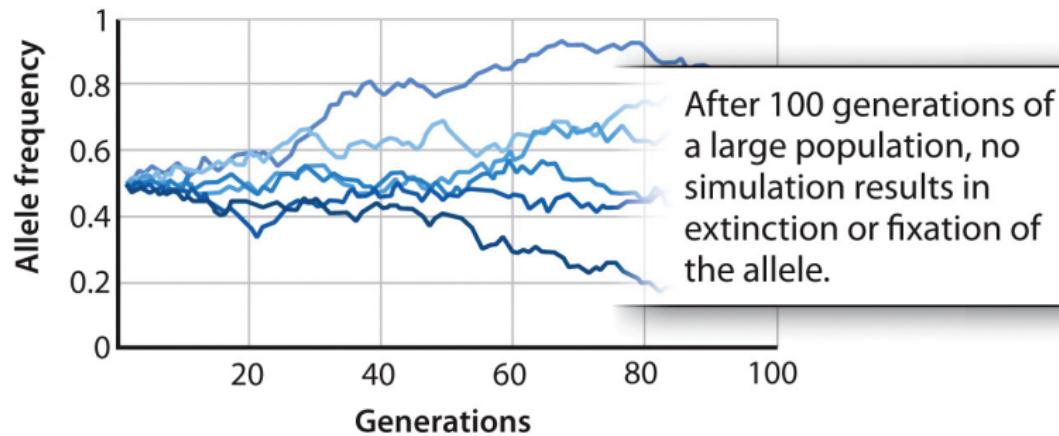
Population size = 40



**Figure 20.13c**  
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# Genetic drift

Population size = 400



**Figure 20.13d**  
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Trait level

Allele level

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Gene flow

Mutation

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Inbreeding

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# Florida panthers



DenGuy/Getty Images

**Figure 20.14**  
*Biology: How Life Works*  
© Macmillan Learning

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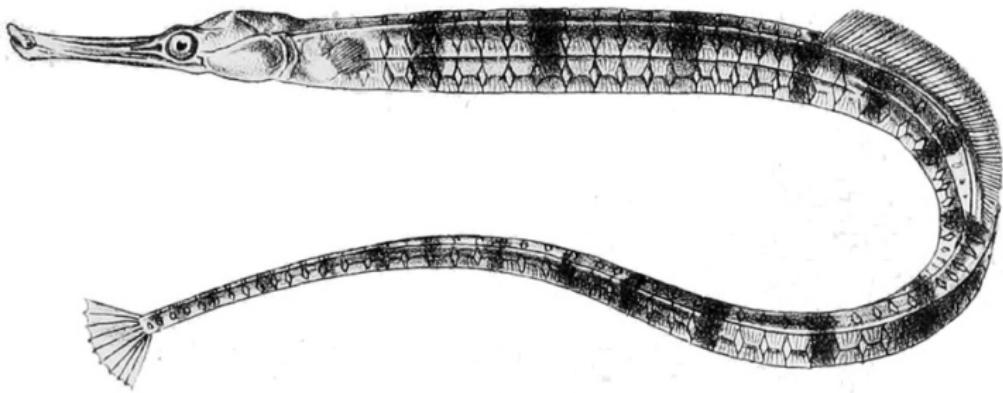
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  - ▶ adaptive, non-adaptive, previously adaptive

# Conclusions

- ▶ **Mutation** (mistakes!) is the source of new variation
- ▶ **Natural selection** drives adaptation: selects variation that allows organisms to thrive in diverse settings
- ▶ **Sex** facilitates new combinations, but **sexual selection** can work against adaptation to the environment
- ▶ **Genetic drift** and **gene flow** are also non-adaptive drivers of evolution
- ▶ The organisms we see are the result of all of these processes:
  - ▶ adaptive, non-adaptive, previously adaptive