Chapter 9

Evidence of Evolution

9.3 Natural Selection in Action

All scientific theories make predictions about what we should observe in nature. If these predictions are confirmed, the theory is supported. The theory of evolution through natural selection has been tested repeatedly against observations of the natural world, and the evidence is overwhelming. In the next sections, we will look at some of this evidence.

Observations of Natural Selection

In many cases, scientists have seen natural selection produce evolutionary changes within relatively short time frames; they have observed and measured the actual changes in populations. These include some of the examples we looked at in the previous chapter:

1. Australian rabbits evolved resistance to the myxoma virus, so that over time a smaller and smaller fraction of individuals died from the disease.

2. Peppered moths evolved to become better camouflaged in their environments—dark moths became more and more common as habitats became polluted, and then they became less and less common as pollution was cleaned up.

3. Bacteria evolved resistance to certain antibiotics, so that these antibiotics no longer controlled infections.

Scientists have also studied how the beaks of Darwin's finches evolve after a drought, how insects evolve resistance to pesticides, and natural selection in a wide variety of other populations.

FIGURE 9.8

Artificial selection has produced great diversity in dogs.

© *Conceptual Biology by Jennifer Yeh*

Artificial selection is the selective breeding of organisms with desirable traits in order to obtain organisms with similar traits. Humans artificially select for desirable traits in domesticated animals and crops all the time: We breed fast racehorses to try to get faster racehorses; different types of dogs to produce superior hunters, herders, or sled pullers (Figure 9.8); and varieties of strawberries to grow the largest and sweetest fruit. In artificial selection, humans control the reproductive success of different organisms and bring about distinct evolutionary changes in populations over time.

FIGURE 9.9

Corn, one of the most important agricultural crops in the world, was laboriously bred through artificial selection from teosinte (above). Teosinte has tiny cobs, only a few rows of kernels, and inedible hard coverings on its seeds.

These changes can be dramatic—think how much a Chihuahua differs from the animal it is descended from, the wolf. Or look at Figure 9.9 to see the difference between the corn we eat today and teosinte, the plant from which corn was bred. Artificial selection has produced countless forms of domestic animals and crops, all with traits valued by humans.

READING CHECK

How do observations of natural selection in action and artificial selection provide evidence for evolution?

CHECK YOUR ANSWER

Scientists have documented natural selection in many different wild populations, including peppered moths, Galápagos finches, Australian rabbits, and many other species. They have documented how natural selection leads to measurable evolutionary changes in these populations, offering direct support for Darwin's theory of evolution.

Artificial selection also provides evidence for evolution. In the case of artificial selection, humans, rather than nature, do the "selecting," but this also results in measurable evolutionary changes in populations over time. Most examples of artificial selection are found in domesticated animals and crops.

© Conceptual Biology by Jennifer Yeh