Chapter 9

Evidence of Evolution

9.6 Biogeography

Biogeography is the study of how species are distributed on Earth. An examination of the evidence from biogeography shows that it supports the theory of evolution through natural selection. That is, it supports the idea that organisms evolved in a certain place and then left descendants in the places where they were able to spread. Biogeography does not support the idea that organisms were specially designed to fit into a specific type of habitat and then distributed where these habitats occur on Earth. For example, even though the Arctic and Antarctic have similar environments, they are occupied by entirely different species (Figure 9.15).

FIGURE 9.15

The Arctic and Antarctic, which have similar habitats, are occupied by very different species. Polar bears are found in the Arctic but not the Antarctic. Penguins are found in the Antarctic but not the Arctic.

What biogeography shows is that the ranges of many species are bounded by geographic barriers such as oceans or mountain ranges. For example, many organisms are restricted to a single continent. In addition, closely related species tend to be found close together, suggesting that they evolved in one place and then spread. For example, all of Darwin's finches are found in or near the Galápagos, and all the honeycreepers are found in Hawaii. Similarly, island species are usually most closely related to species found on the closest mainland. Islands also tend to have fewer species than an area of equal size on the mainland, and many island species are *endemic*, meaning they are found nowhere else on Earth.

Finally, islands tend to be occupied by many flying animals but few terrestrial ones (Figure 9.16). All these points suggest that organisms were not dispersed purposefully around Earth but, instead, they evolved in one place and then left descendants where they were able to spread.

FIGURE 9.16

Why are terrestrial vertebrates rare or absent from islands, whereas flying species are common? This is the Hawaiian hoary bat, the only mammal found on Hawaii prior to human colonization of the islands.

READING CHECK

Many species found on islands resemble species found on the nearest mainland. How does this provide evidence for evolution?

CHECK YOUR ANSWER

This pattern suggests that island species evolved when some mainland individuals colonized the island and then evolved in isolation, rather than that species were distributed purposefully around Earth.

You can read more about biogeography and evolution here:

https://evolution.berkeley.edu/evolibrary/article/0_0_0/history_16