18.5I: Biogeography and the Distribution of Species

The biological distribution of species is based on the movement of tectonic plates over a period of time.

Learning Objectives

- Relate biogeography and the distribution of species

Key Points

- Biogeography is the study of geological species distribution, which is influenced by both biotic and abiotic factors.
- Some species are endemic and are only found in a particular region, while others are generalists and are distributed worldwide.
- Species that evolved before the breakup of continents are distributed worldwide.
- Species that evolved after the breakup of continents are found in only certain regions of the planet.

Key Terms

- **endemic**: unique to a particular area or region; not found in other places
- **generalist**: species which can thrive in a wide variety of environmental conditions
- **Pangaea**: supercontinent that included all the landmasses of the earth before the Triassic period and that broke up into Laurasia and Gondwana
Distribution of Species

Biogeography is the study of the geographic distribution of living things and the abiotic factors that affect their distribution. Abiotic factors, such as temperature and rainfall, vary based on latitude and elevation, primarily. As these abiotic factors change, the composition of plant and animal communities also changes.

Patterns of Species Distribution

Ecologists who study biogeography examine patterns of species distribution. No species exists everywhere; for example, the Venus flytrap is endemic to a small area in North and South Carolina. An endemic species is one which is naturally found only in a specific geographic area that is usually restricted in size. Other species are generalists: species which live in a wide variety of geographic areas; the raccoon, for example, is native to most of North and Central America.

Since species distribution patterns are based on biotic and abiotic factors and their influences during the very long periods of time required for species evolution, early studies of biogeography were closely linked to the emergence of evolutionary thinking in the eighteenth century. Some of the most distinctive assemblages of plants and animals occur in regions that have been physically separated for millions of years by geographic barriers. Biologists estimate that Australia, for example, has between 600,000 and 700,000 species of plants and animals. Approximately 3/4 of living plant and mammal species are endemic species found solely in Australia.

Figure 1: Australia: Australia is home to many endemic species. The (a) wallaby (Wallabia bicolor), a medium-sized member of the kangaroo family, is a pouched mammal, or marsupial. The (b) echidna (Tachyglossus aculeatus) is an egg-laying mammal.

The geographic distribution of organisms on the planet follows patterns that are best explained by evolution in conjunction with the movement of tectonic plates over geological time. Broad groups that evolved before the breakup of the supercontinent Pangaea (about 200 million years ago) are distributed worldwide. Groups that evolved since the breakup appear uniquely in regions of the planet, such as the unique flora and fauna of northern continents that formed from the supercontinent Laurasia and of the southern continents that formed from the supercontinent Gondwana. The presence of Proteaceae in Australia, southern Africa, and South America is best explained by the plant family’s presence there prior to the southern supercontinent Gondwana breaking up.
Figure 1: Biogeography: The Proteacea family of plants evolved before the supercontinent Gondwana broke up. Today, members of this plant family are found throughout the southern hemisphere (shown in red).

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