Chapter 40—Why Organisms Live Where They Do

I. Introduction to Ecology
   A. Definition of ecology: The study of the interactions of organisms with each other and the environment.

   B. Ecology can be studied at different levels; 2 are encompassed in this chapter:
      1. Individual
      2. Population

II. Biogeography: the study of the distribution of organisms
   A. Each species has had a single point of origin i.e., each species has evolved once.

   B. Many species have dispersed from their point of origin.

   C. Range: the geographical extent over which a species may be found.
      1. Individuals or populations of a species are not necessarily found in all locations within their range.
      2. Habitat—the physical environment in which a particular species may be found.
      3. Dispersion: the arrangement of individuals of a species in space; may vary locally or regionally.
         a. random dispersion
         b. clumped dispersion
         c. even dispersion
      4. Proximate causes refer to immediate conditions determining distribution (e.g., resource availability, behavioral interactions).

         Ultimately, distribution (and abundance) of an organism depends upon its chances of survival and successful reproduction in a particular place.

III. Factors Determining Species Distribution
   A. Historical perspective
      1. Evolutionary history
         e.g., koala, kangaroo in Australia
      2. Continental drift
         e.g., Southern beech trees in Australia, South America, and [previously] in Antarctica
B. Physical environment
1. Organism's adaptations to particular climates and microhabitats e.g., temperature, moisture availability, nutrient availability.

2. Abiotic events (e.g., fires, floods) can influence distributions.

C. Biological factors
1. organism's own ability to disperse
   e.g., bats only native mammals on Hawaiian Islands

2. presence of competitors
   e.g., *Balanus balanoides* is limited in its latitudinal range

3. human activities
   a. local or regional extirpation
      e.g., loss of wolves throughout most of contiguous United States

   b. species introductions
      e.g., stoats and New Zealand birds

   c. habitat loss

IV. Applications—Why Study Species Distributions?
A. Add to our knowledge of world around us.

B. Address issues relevant to species conservation.
   e.g., “Hot Spots”

C. More effectively control pest species.
   e.g., fire ants