

Chapter 4 – Population Biology

Section 4.1 – Population Dynamics

1. _____ – group of organisms, all of the same _____, which live in a specific area. A _____ population will grow and die at a relatively _____ rate unless it runs out of water, food, or space, or is attacked in some way by disease or predators.
- How fast do populations grow?
 - _____ growth – as a population gets larger, it also grows at a _____ rate. _____ shaped curve
 - Carrying capacity – _____ of organisms of one species that an environment can _____ indefinitely.
 - Population Growth with a _____ Curve. See Figure 4.4 on page 94
 - _____ growth - The initial increase is _____ because the number of reproducing individuals is _____.
 - _____ growth – There are _____ organisms, and many are reproducing, resulting in a faster increase in the number of individuals. Growth is exponential.
 - _____ off – As the population grows, more organisms are using the existing resources. Growth _____. Graph begins to resemble an _____
 - Carrying capacity – The environment can support this many organisms. If population size rises _____ the carrying capacity, _____ organisms die than are born. The population drops below the carrying capacity.
 - _____ – The number of organisms tends to rise and fall around the carrying capacity due to _____ factors.
2. Reproduction Patterns
- _____ pattern
 - _____ -life history pattern
 - Organisms tend to have _____ body size, mature _____, reproduce _____, have a _____ life span.
 - Populations increase _____, then decline when environmental conditions suddenly _____ and become unsuitable for life. Small population that survives will reproduce exponentially when conditions are again _____.
 - Example: _____
 - _____ -life history pattern
 - Organisms tend to have a _____ body size, mature _____, reproduce _____, and are long-lived.
 - Populations are maintained at sizes at or near carrying capacity.

3. Example: _____

3. Density Factors and Population Growth

a. Three patterns of dispersal: _____, _____, and _____.

b. Two types of limiting factors that are related to dispersal

i. Density-_____ factors

1. Examples: disease, competition, predators, parasites, and food.

2. These factors have an increasing effect as the population _____.

ii. Density-_____ factors

1. Examples: volcanic eruptions, temperature, storms, floods, drought, chemical pesticides, and major habitat disruption.

2. These affect populations, _____ of their density.

4. Organism Interactions Limit Population Size

a. _____ affects population size

i. Populations of predators and their prey experience _____ or changes in their numbers over periods of time.

1. _____ populations can affect the size of prey populations.

_____ populations can affect the size of predator populations.

2. In prey populations, the young, old, or injured members are caught. Predation _____ the chance that resources will be available for the remaining individuals in a prey population.

b. _____ within a population

i. Density-dependent factor

1. When only a few individuals compete for resources, no problem arises. When a population increases to the point where _____ for resources exceeds the _____, the population size decreases.

c. The effects of crowding and stress

i. As populations increase in size in environments that cannot support increased numbers, animals can become _____.

1. Symptoms of stress include: aggression, decrease in parental care, decreased fertility, decreased resistance to disease. All of these can have a negative effect (_____ factor) on a population.

Section 4.2 – Human Population

5. World Population

- a. _____ – study of human population size, density, distribution, movement, birth and death rates.
- b. Human population growth
 - i. Humans can consciously _____ their environment. Combat diseases, make medical advancements, provide clean water, develop methods for producing more food.
 1. This allows people to live longer, produce more offspring, and cause population _____.
- c. Calculating growth rate
 - i. _____ – number of live births per 1 000 population in a given year
 - ii. _____ – number of deaths per 1 000 population in a given year.
 - iii. _____ – movement of individuals into a population
 - iv. _____ – movement out of a population
 - v. Two formulas for Population Growth Rate (PGR):
 1. $(\text{Birthrate} + \text{Immigration rate}) - (\text{Death rate} + \text{Emigration rate})$
 2. Birthrate – Death rate
 - a. If the rate is _____, the number of new individuals entering the population _____ the number of individuals that are leaving the population
 - b. If PGR is greater than _____, the population is _____
 - c. If PGR is _____ than zero, fewer individuals are entering the population than are leaving.
- d. _____ time – time needed for a population to double in size.
- e. Age structure – _____ of the population that are in different age levels.
 - i. _____ growth – the percentage of people in each age category will be fairly equal
 - ii. _____ growth – highest percentages will be seen among children and teens
- f. _____ and growth
 - i. Sometimes a population grows more _____ than the available resources can handle. Food and water can become scarce or contaminated. Amount of waste produced becomes difficult to dispose of properly.
 - ii. These conditions can lead to stress on current resources and contribute to the spread of diseases that affect the _____ of human populations