Population Dynamics

**Population Characteristics**

Population Ecology: A sub-field of ecology that focuses on the dynamics of populations and how populations interact with their environment

Geographic Range: The overall spatial boundaries within which a population lives

Population Size (Nt): The number of individuals of a specific species that occupies a given area/volume at a given time

Habitat: The place where an organism usually lives

Population Density (D): The number of individuals of the same species that occurs per unit area or volume

Crude Density: Population density measured in terms of the number of organisms of the same species within the total area of the entire habitat

Ecological Density: Population density measured in terms of the number of individuals of the same species per unit area or volume that is actually used by the individuals

Dispersion: The pattern of distribution in which a population exists; may be clumped, random, or uniform

Quadrat: A sampling frame that is used for estimating population size; the frame can be real or virtual

Mark-recapture Method: A sampling technique for estimating population size and density by comparing the proportion of marked and unmarked animals that are captured in a given area; sometimes called the capture-recapture method.

~Calculating Population Density: D=N/S

~D=density, N=Population Size, S=Size

~Calculating Population Size: N=Mn/m

~N=Total Population, M=Total number marked, m=Number of recaptures, n=Size of second sample

~Clumped dispersion is a pattern in which individuals in a population are more concentrated in certain parts of the habitat

~Random dispersion occurs when environmental conditions do not vary greatly within a habitat and individuals are neither attracted to nor repelled by others of their species

Uniform dispersion occurs when individuals can be equally spaced throughout a habitat

**Demography**

Demography: The study of the growth rate, age structure and other characteristics of population

Natality/Mortality: The birth rate in a population/the death rate in a population

Immigration: The movement of individuals into a population

Emigration: The movement of individuals out of a population

Life Table: A chart that summarizes the demographic characteristics of a population

Cohort: A group of individuals of similar ages

Age-Specific Mortality: The proportion of individuals that were alive at the start of an age interval but died during the age interval

Age-Specific Survivorship: The proportion of individuals that were alive at the start of an age interval and survived until the start of the next age interval

Survivorship Curve: A graphic display of the rate of survival of individuals over the lifespan of a species

Fecundity: The potential for a species to produce offspring in a lifetime

Generation Time: The average time between the birth of an organism and the birth of its offspring

Sex Ratio: The relative proportion of males and females in a population

**Factors That Affect Population Growth**

Limiting Factor: A factor that limits the growth of a population

Density-Dependent Factor: A factor that is influenced by population density, having a greater impact as the population density increases

Density-Independent Factor: A factor that influences population regulation, regardless of population density

Competition: An interaction in which both competing populations lose access to some resources

Interspecific Competition: Competition between members of the same population for resources

Intraspecific Competition: Competition between members of different species

Allee Effect: A density-dependent phenomenon that occurs when a population cannot survive or fails to reproduce enough to offset mortality once the population density is too low

Minimum Viable Population Size: The smallest population size that is likely to survive both predictable and unpredictable environmental variation; note that it is only a prediction

**Interactions Between Individuals**

Coevolution: A process in which one species evolves in response to the evolution of another species

Mutualism: An interaction in which both partners benefit

Herbivory: The interaction between herbivorous animals and the plants that they eat

Parasitism: An interaction in which one species benefits and the other is harmed

Commensalism: An interaction in which one species benefits and the other one is unaffected

Mimicry: A form of defense in which one species evolves an appearance that resembles the appearance of another species

Interference Competition: Competition in which all the individuals have equal access to resources; the fitness of some individuals is reduced by the presence of others

Exploitative Competition: Competition in which all the individuals have equal access to resources; some have superior ability to gather resources

Fundamental Niche: Range of conditions and resources that a population can possibly tolerate and use

Realized Niche: The range of conditions and resources that a population actually uses in nature

Resource Partitioning: A situation in which several species live in the same place use different resources or use the same resources in different ways

Defense mechanisms: Camouflage, chemical defense, mimicry

Different types of symbiotic relationships: Mutualism, commensalism, parasitism