

Population Ecology 53.2-53.5

I) Introduction

- a) **Population** = group of potentially interbreeding organisms of same species
 - i) living in same area/ same time
 - ii) share common gene pool
 - iii) share same resources
 - iv) influenced by same environmental factors
- b) **Ecology** = study of interactions between **living organisms** and physical **environment**
- c) **Population Ecology**:
 - i) Considers number of individuals of a species in an area & pop dynamics
- d) **Populations Dynamics**
 - i) Study of **change in population**
 - ii) **How and why** pop size increases or decreases over time
 - iii) determine **processes common** to all populations
 - iv) **Different features** of population studied

II) Changes in Population Size: Pop Growth

- a) **Evaluation of Change in population**
 - i) All populations have potential to change in size over time
 - (1) Change in population size = Births + Immigrants entering population - Death - Emigrants leaving populations

III) Change in Population Size Over Time

- a) Let's consider just births (B) and deaths (D) and no immigration or emigration
- b) **Population Growth Rate** can be expressed mathematically as: $\frac{\Delta N}{\Delta t} = B - D$
 - i) ΔN = change in population size
 - ii) Δt = time interval
 - iii) B = number of births
 - iv) D = number of deaths

IV) Per Capita (Per individual) Growth Rate

- a) Now express **B** as **average birth (bN) per capita** (per individual) per year →
 - i) **b = per capita birth rate** → number offspring produced per year by average member of population → calculate
 - ii) divide total number birth by total number of individuals
 - (1) Ex: 75 births per year in population of 1,000 individuals
 - (a) $b = 75/1000 = 0.075$ births per individuals
 - iii) **B = bN = expected number of births per year** in population of any size
 - (1) Ex: In a population of 200 individuals
 - (2) B (number of births) = $0.075 \text{ births per individual} \times 200 \text{ individuals} = 15 \text{ births}$
- b) now express **D** as **average death (mN) per capita** (per individual) per year →
 - i) **m = per capita death rate** → (= mortality) expected number deaths per year → calculate
 - (1) divide total number of death by total number of individuals
 - (a) Ex: 20 deaths per year in population in 1,000 individuals