**Changes in Population Size (11.2)**

Why do changes in population size occur?

Humans tend to move more than most species, so when ecologists study population sizes in non-human populations, immigration and emigration are estimated to be roughly equal.

Change in Pop. Size = # of births - # of deaths

∆N = B – D

If immigration & emigration are included:

∆N = [B + I] – [D + E]

Rate of Population Growth-important to study so it can help ecologists make management decisions (whether increasing or decreasing).

gr = ∆N (∆N = N2 – N1)

∆t

Per capita growth rate (cgr):

cgr = ∆N

N

Population Growth Models:

Biotic Potential: the highest possible per capita growth rate for a population determined by:

* # of offspring per reproductive cycle
* # of offspring that survive long enough to reproduce
* Age of reproductive maturity
* # of times the individuals reproduce in a life span
* The life span of the individuals

**Exponential Growth:** growth pattern exhibited by a population growing at its biotic potential, has characteristic J-shaped growth curve. P514 Fig. 11.16

**Logistic Growth:** limited resources, slow initial growth, rapid growth, then stabilizing population as the *carrying capacity* of the population is reached.

P515 Fig. 11.17. P516 Fig. 11.18-illustrates the limiting factors that prevent a population from growing exponentially.

*Life Strategies*: when an organism makes trade-offs to maximize the number of offspring that survive. Ecologists have identified two types of life-strategies:

* ***r*-selected strategy**: live close to their biotic potential (*r*) and therefore these organisms usually have a short life span, become sexually mature at a young age, produce large broods of offspring & provide little or no parental care to their offspring
  + ***E***.g. insects, annual plants, algae
* ***K*-selected strategy**: live close to the carrying capacity (*K*) of their habitats and therefore these organisms have a relatively long life span, become sexually mature later in life, produce few offspring per reproductive cycle & provide a high level of parental care.
  + ***E***.g. mammals & birds

HMK:

P519 #1,3,5,6,10,11,13