Population Dynamics Chapter 10 Are populations static, or do they change??? Population dynamics is a branch of ecology that studies that change How do they change?

Birth rates Death rates Emigration Immigration Distribution



Population Dynamics – populations in flux Dispersal

- Dispersal can increase or decrease local population densities
 - Africanized honeybees disperse much faster than European honeybees



Rates of expansion aka dispersal of selected species

How fast do populations disperse?



What causes population dispersal?
Causes of dispersal: Climate Change
Organisms began to spread northward about 16,000 years ago following retreat of glaciers

- and warming climate.
 - * Movement rate 100 400 m/yr.



Causes of Dispersal: Changing Food Supply Increased prey density led to increased density of predators.







Causes of Dispersal: Flow in Rivers and Streams & Oceans

- Mechanisms to allow organisms to maintain their position.
 The colonization cycle
 - * Streamlined bodies
 - * Bottom-dwelling
- * Adhesion to surfaces Constant state of

flux in many populations!

Problem: Insect larvae in streams

Many organisms engage in upstream movements that appear to compensate for downstream drift.

In the colonization cycle, upstream and

downstream dispersal and reproduction have major influences on

stream populations.

Drift moves organisms downstream, sometimes actively as behavioral drift, sometimes passively with floods.

Potential result from ongoing dispersal: Metapopulations

 A metapopulation is made up of a group of subpopulations living on patches of habitat connected by an exchange of individuals.



Population Survival: Survivorship Curves

Summarizes the pattern of survival in a population

How do you get the data for these curves?

Cohort life table Identify individuals born at same time and keep records from birth to death. Static life table

Record age at death of individuals.

Do you see any potential problems with these methods?

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Example of a potential problem!!!

- Cohort life tables birth to death
 * It's hard getting the data!!!
 - A Great Basin Bristlecone Pine called Methuselah is 4,841 years old!

So, this information isn't perfect, but still provides pretty good data!



From data table to survivorship curve

Type I: Majority of mortality occurs among older individuals. Dall Sheep



Type III: High mortality among young, followed by high survivorship. *Cleome droserifolia*



From data table to survivorship curve



Type II: Constant rate of survival throughout lifetime. American Robins

Type III: High mortality among young, followed by high survivorship. *Cleome droserifolia*



mission required for reproduction or display

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Survivorship Curves – will be doing in lab this week!!!



Some questions!

- Female cottonwood trees (*Populus*) produce millions of seeds each year. What curve do you think this tree would most likely follow? Why?
- What curve do you think humans follow?
- What could cause the human survivorship curve to change?





Population Age Distribution Age distribution of a population reflects its history of survival, reproduction, and growth potential.

Cottonwoods (New Mexico)

White oaks (Illinois)

