Life Histories Chapter 12 An organism's life history consists of adaptations that influence aspects of its biology like: # offspring Offspring survival Size and age at reproductive maturity



Offspring Number Versus Size

- Principle of Allocation: If organisms use energy for one function such as growth, the amount of energy available for other functions is reduced.
 - * Leads to trade-offs between functions such as number and size of offspring.

Basically, the bigger your babies are, the fewer you'll have!!!



Fecundity

 The number of eggs or seeds produced by an organism

Which has a higher fecundity?





Fecundity, continued

 Larger individuals tend to have a greater fecundity than smaller ones

Why is this important to us???

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Big Fish Produce Far More Young





Vermilion Rockfish (Sebastes miniatus)

Fecundity, continued

Larger eggs leads to fewer eggs, or less • fecundity

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Fecundity, continued

 WE STOPPED HERE!!!Larger and fewer eggs leads to less gene flow and therefore more genetic isolation occurs – evolutionary

consequences too! this happens?

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Plant g

Four plant form * Graminoids: * Forbs: Herb * Woody Plant * Climbers: Cli • Woody pla

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mass of se forbs.



Dispers Six seed disper * Unassisted:

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- * Adhesion: He
- Wind: Wings
- * Ant: Oil surfa
- * Vertebrate: F
- * Scatterhoard





Seed Size



eaten by verts. d in hiding place. utue e canvaret ch?



Amount of disturbance and Seed Size
Small plants producing large number of small seeds appear to have an advantage in areas of high disturbance.

What is a disturbance? Why would this happen?

Competition, shade, nutrient shortage, drought





Seed Size and Seedling Performance

- What happens AFTER the seed phase???
 - * Germination produces a seedling
 - * Larger seeds produce larger and taller seedlings and were associated with increased recruitment.



- Seed Size and Seedling Performance
 Larger seedlings from larger seeds led to more recruitment.
- How do you think this manifests itself?
 Let's talk about adults!



Adult Survival and Reproductive Allocation

- If adult survival is lower reproduction begins earlier
 - * More energy is invested into reproduction



Humans? Around 400 mature eggs in a lifetime!



Some species of roundworm may contain more than 27 million eggs at one time and lay more than 200,000 of them in a single day

Life History Variation Among Species

If you die earlier, you make more babies and you have them earlier!



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Lizards and snakes that

Discussion Question

- Humans aren't following this pattern!!!
- The age of puberty is going down, but we're living longer!!!
- ・Why?

Other possible factors: **Improved nutrition** More fat in diet Natural selection Gradual change in world temperature Drop in incidence of disease Obesity Sedentary lifestyle



Life History Classifications So, we've talked about fecundity (offspring #) and how that relates to: offspring survival, offspring size, and age at reproductive maturity.



Life History Classifications Life can be classified on the basis of:

- Fecundity
- Survival
- Offspring size
- Age at reproductive maturity
- r & K selection
 - * r selection
 - Characteristic high population growth rate.
 - * K selection (carrying capacity)
 - Characteristic efficient resource use.

The r-K Scale of Reproductive Strategy: Balancing Egg Output versus Parental Care



Oysters are an example of a very *r*-strategy. They produce 500 million fertilized eggs a year and provide no parental care. The great apes are an example of a very *K*-strategy. They produce one infant every five or six years and provide extensive parental care.

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r and K: Fundamental Contrasts •r and K are ends of a continuum most organisms are in-between

r selection: Unpredictable environments (high disturbance) K selection: Pr r - Selected or Exponential Population Growth 5000 nents 5000-K - Selected or S Curve K = 1000 4000 4000 disturbance)

Characteristics favored by r versus K selection

Population Attribute	r Selection	K Selection
Intrinsic rate of increase, r_{max}	High	Low
Competitive ability	Not strongly favored	Highly favored
Development	Rapid	Slow
Reproduction	Early	Late
Body size	Small	Large
Reproduction	Single, semelparity	Repeated, iteroparity
Offspring	Many, small	Few, large

Source: After Pianka 1970



Which is r selected? Which is K selected?







- Offspring size
- Age at reproduct





In type I survivorship, juvenile survival is high and most mortality occurs among older individuals.

r or K?

In contrast, individuals in a population with type II survivorship die at equal rates, regardless of age.

Individuals showing type III survivorship die at a high rate as juveniles and then at much lower rates later in life.

Old



Is K always better than r?

Would r ever be a better life strategy?
 When?

