

Lecture 6: Reproduction

I. Introduction

A. Objectives

1. Appreciate diversity of reproductive adaptations, from the individual's point-of-view
2. Recognize the many tradeoffs that go into reproductive strategies and tactics
3. Set the stage for understanding population-level implications of reproductive strategies (more later)

B. Significance

1. crucial link to fitness
2. major use of energy
3. resources are limited
4. specialization promotes speciation

II. Fecundity

A. Definition

Number of eggs spawned per year

B. Ecological determinants

1. body size or age
2. food availability

C. Egg number vs. egg size

1. trade-off for individual female
2. range of strategies

D. Spawning frequency

1. iteroparity vs semelparity
2. single vs batch (fractional) spawning

E. Geographic and phylogenetic patterns

1. marine vs freshwater
2. latitudinal gradient

III. Spawning synchronicity

A. What has to happen (physiology and behavior)

1. develop gonads
2. perceive spawning season
3. mature gametes
4. choose mates
5. spawn

B. Seasonal stimuli

1. temperate fishes

2. tropical freshwater fishes

3. hormones

IV. Reproductive guilds (or at least a subset of them)

A. Non-guarders

1. Broadcast spawners
 - a. herrings, ocean sunfish, striped bass

 - b. walleye

 - c. pikes

2. Brood hiders
 - a. grunnions

 - b. *Cyprinella* shiners

 - c. pirate perch

B. Guardians

1. Substrate choosers
 - a. many darters and minnows

2. Nesters
 - a. cavity nesters

 - b. depression excavators

 - c. mound builders

C. Bearers

1. External bearers
 - a. mouth bearers

 - b. pouch bearers

 - c. gill bearers

2. Internal bearers
 - a. ovovivipary

 - b. vivipary

V. Life on the spawning grounds

A. Meeting a mate

1. Social schooling

2. Territoriality

B. Male – female interactions

1. Cheap sperm, expensive eggs

2. Enticement and inducement

a. quickness

b. coloration

c. nest site quality

d. mating rituals

3. Mating systems

a. monogamy

b. polyandry

c. polygyny

4. Mate and nest swapping in darters

a. parentage analysis

b. location, location, location...