

## Parental Care and Mating Systems

### I. Reproductive effort (RE)

A. Components: (1) parental effort, (2) mating effort

B. Prediction: males should expend more RE for mating effort while females expend more in parental effort.

1. Because a male has more to gain by abandoning and finding another mate.

2. Exceptions:

a. no females are available

b. synchronous broods

c. takes 2 parents to raise the brood

d. females desert first

### II. Parental care

#### A. Females

1. Egg mass

2. Nest construction

3. Provision young: mass or progressive

a. Forage for prey or food items

b. Catabolize body resources

4. Defend eggs, young, or food source

B. Males: though rare, it does occur

1. Provide nutrients for eggs through seminal fluids-- Colias eurythema

2. Provide nutrients for eggs through nuptial meals

a. Scorpion flies

- b. Preying mantids -- they themselves become the meal
- 3. Defense
  - a. nest or resources: Nicrophorus species (burying beetles)
  - b. Eggs: on the backs of giant water bugs
- \*\*This could be a case for role reversal because the males may be the limiting resource\*\*\***
- 4. Brood care
  - a. Aeration of eggs in Belastoma spp.
  - b. Brood feeding in Nicrophorus spp.
- 5. Nest construction: Nicrophorus, termites

### III. Mating effort (adaptations)

#### A. Intrasexual selection

- 1. Precopulatory access to potential mates
  - a. Skill in mate location
  - b. Production of effective mate-attracting signals
  - c. Aggressive competence in the defence of mates and territories
  - d. Capacity to avoid damaging interactions with rivals
- 2. Postcopulatory competition for access to eggs
  - a. Mate concealment
  - b. Mate guarding
  - c. Mate takeover
  - d. Sperm competition
- 3. Postfertilization of rival zygotes
  - a. Ability to induce abortion of fertilized eggs

b. Infanticide

B. Intersexual selection

1. Mate discrimination by choosy sex (usually female)
  - a. Rejection of members of wrong species
  - b. Selection of genetically superior conspecific partner
  - c. Selection of partner with useful resources or services
2. Attributes that make individuals attractive to opposite sex
  - a. Attractive courtship behavior
  - b. Attractive morphological characters
  - c. Attractive material benefits

IV. Male mating systems

A. Monogamy: male mates with only one female per breeding season (mate monopolization potential is very low).

1. Mate guarding monogamy: male remains with mate in order to prevent her from copulating with other males.
2. Mate assistance monogamy: male remains with mate in order to elevate her reproductive output.

B. Polygynous mating systems: some males mate with more than one female per breeding season.

1. Mate monopolization potential of males is high due to the clumped distribution of females or resources attractive to females.
  - a. Female defense polygyny: some males prevent others from gaining access to mates by defending groups of females.
  - b. Resource defense polygyny: some males prevent others from gaining access to mates by defending resources that attract receptive females.

- 1) Defense of resources as and where they occur

- 2) Defense of resources after they have been collected by a male
2. Male mate monopolization potential is fairly low, often because the emerging or resource using females are widely dispersed.
- a. Pure dominance or lek polygyny: some males gain access to mates by excluding others from certain "symbolic" mating territories preferred by selective females.
    - 1) Defense of perch on a landmark site
    - 2) Defense of a waiting site on the periphery of a dispersed resource area
  - b. Scramble competition polygyny: males make no effort to defend an exclusive mating territory but instead attempt to outrace their competitors to receptive females.
    - 1) Explosive mating assemblage: receptive females are abundant during a very brief mating period.
    - 2) Prolonged searching polygyny: receptive females cannot be economically monopolized because of their even distribution or the high rate of competition from intruder males.

## V. Female mating systems

A. Monogamy: the female mates with a single male during one breeding season.

B. Polyandry: the female mates multiply, receiving sperm from more than one male during one breeding season.

### 1. Sperm replenishment polyandry

- a. The female adds to her depleted or inadequate sperm supplies.
- b. The female avoids the cost of storing and maintaining large quantities of sperm from a single donor.

### 2. Material-benefit polyandry

- a. The female's partner provides nutritional benefits or other material resources in return for mating.
  - b. The female's partner helps reduce the risk of predation or helps her reduce competition for a resource.
  - c. The female's partner provides protection from other sexually active males.
3. Genetic-benefits polyandry
- a. The female replaces sperm of a genetically inferior mate with the gametes of a genetically superior individual.
  - b. The female adds sperm from a genetically different male to her sperm supplies to increase the genetic diversity of her offspring.
4. Convenience polyandry -- The female avoids the cost of trying to prevent superfluous copulations.