

## SEXUAL SELECTION (very powerful concept)

Selection for traits which enhance mating success.

Two approaches to increasing mating success

1. INTRASEXUAL SELECTION: Out compete conspecifics for access to opposite sex (contests of aggression)
2. INTERSEXUAL SELECTION: Be more attractive than other conspecifics to opposite sex (contests of choice)

If sexual selection is unequal between the sexes, will lead to SEXUAL DIMORPHIC traits

Which sex is expected to experience the greater effects of sexual selection?

The one with the greater variance in mating success - usually the male

Why?

Identify intersexual asymmetries to potential mating success and mating variance; which sex most affected?

Operational Sex Ratio (which sex is limited resource)

(sexually available females/sexually available males)

male-biased (OSR <1) → males compete for females

female-biased (OSR >1) → females compete for males

Parental Investment (< → > variance)

Gamete size and number

Post-zygote care

Life History (reproductive/mortality) traits

Altricial/precocial

Oviparous/viviparous

Semelparity/iteroparity

small brood/large brood

longevity/age & sex specific mortality

Ecological Constraints (overlays life history constraints)

Distribution of resources (food, critical habitat)

Density independent/dependent mortality

Similar sexual selection pressure on both sexes → MONOGAMY, and little sexual dimorphism

Dissimilar sexual selection pressure on the sexes →

POLYGAMY (usually POLYGYNY, sometimes POLYANDRY), and pronounced sexual dimorphism [aggressive, enthusiastic males; choosy, reluctant females]

PATERNAL UNCERTAINTY

Male guarding, infanticide, genital plugs, sperm competition, etc.

### Mating Systems & Criteria

I. MONOGAMY - Neither sex can monopolize additional members of opposite sex - Fitness > via shared parental care.

- A. Resources uniformly distributed
- B. Synchronously available receptive mates ( $OSR \approx 1$ )
- C. Altricial young
- D. Food for young scattered
- E. Parents capable of sharing parental duties
- F. Long lived species

II. POLYGYNY - Individual males attempt to control access to multiple females

1. RESOURCE DEFENSE POLYGYNY - Males control access to females indirectly by monopolizing critical resources

- A. Resources must be defensible and spatially clumped
- B. Female choice will involve quality of male and his territory
- C. Involve male-male competition for control of resources
- D. Limited parental care (precocial development)

2. FEMALE DEFENSE POLYGYNY - Females gregarious, individual males control access to females directly

- A. Female clumping can lead to intense male- male competition
- B. male-male competition leads to intrasexual selection for > aggressiveness,  
> body size, > weaponry
- C. Rare among birds

3. MALE DOMINANCE POLYGYNY - Males cannot monopolize resources or females; males aggregate and females select mate from aggregation

A. Males totally emancipated from parental care

B. Critical resources: 1) superabundant; 2) unpredictable, or 3) male density too high

C. Males compete for dominance, communal display area, maximum opportunity for female choice (intersexual selection)

D. Alternative male strategies (satellite, sneaky, forced copulations)

E. Two expressions

1. Explosive breeding Assemblages - short, very synchronous breeding season, OSR  $\approx 1$ , promiscuous, less opportunity for minimum sexual selection

2. Leks - Females less synchronous, long breeding season, males continuously active, OSR  $< 1$

III. RAPID MULTIPLE CLUTCH POLYGAMY - male & female with equal opportunity to  $>$  fitness via multiple breedings in rapid succession (male & female incubate separate clutches)

A. Male assumes full burden of incubation & brood rearing

B. Females emancipated from parental care,

$>$  potential for multiple matings

C. System should evolve IF: 1) large fluctuations in environmental conditions leading to nest failures; or 2) low nesting success due to high predator pressure

D. Young moderately precocial and phylogenetic history to shared incubation duties

IV. POLYANDRY - Individual females gain control to multiple males. RMCP preadapts for polyandry. OSR  $> 1$  because incubating males are not reproductively active. Females compete for limited males

1. RESOURCE DEFENSE POLYANDRY - Female controls access to males indirectly by monopolizing critical resources

A. OSR  $> 1$

B. Asynchronous availability of males

C. Prime nesting habitat limited and controllable

## 2. MALE DEFENSE POLYANDRY - Individual

females directly control access to males

- A. Females larger than males
- B. High population densities
- C. Shifting food and nest sites (cannot be defended)
- D. Some females cannot find non-incubating males, and go without breeding

Mating systems can be mutable within a single species:

Monogamy ↔ RMCP ↔ Resource Defense Polyandry

(spotted sandpiper)

Monogamy ↔ Facultative Resource Defense Polygyny

(many bird species)

Resource Defense Polygyny (males in low density) ↔ Lekking (males in high density)

(Uganda kob)

---

## Some Factors Affecting Mating Systems

### Distribution of females in time and space

1. Asymmetric (clumped or dispersed) →  
male dominance polygyny (leks & promiscuity)
2. Symmetric
  - a. Clumped → Territorial polygyny  
(resource/female defense polygyny)
  - b. Dispersed → Territorial monogamy

### Ecological Situations

1. Unpredictable → Monogamy
2. Nest Destruction → RMCP

### Developmental Constraints

1. Altricial → Monogamy
2. Precocial → Polygyny

### Parental Care Constraints

1. Shared → Monogamy, RMCP, Polyandry
2. male-limited → Polygyny