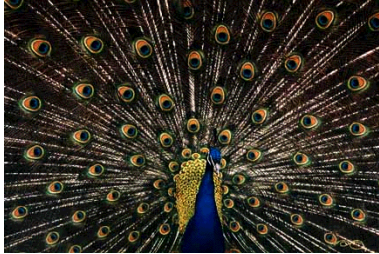


Sexual Selection



Sexual Dimorphism

= consistent phenotypic difference between sexes other than basic functional differences in reproductive organs



The Puzzle of Sexual Dimorphism

- Natural selection favours traits that improve survival and fecundity
- If traits like the peacock's tail do that - why are they not present in both sexes?
- If such traits don't improve survival and fecundity - why are they present at all?

Sex is the Answer

- Asexual organisms only have to survive and then reproduce - *Natural selection*
- Sexual organisms also have to persuade the opposite sex to cooperate in reproduction
- Individuals vary in their persuasive abilities, and this variation is heritable - *Sexual selection*

Sexual Selection

- A result of differences in the mating success of individuals with different phenotypes
- Traits favoured by sexual selection ("secondarily sexual traits") increase mating success but may be opposed by natural selection

How can Sexual Selection Explain Sexual Dimorphism?

- Asymmetries (this lecture)

Next lecture:

- Intrasexual selection (male-male)
- Intersexual selection (female-male)

Asymmetries in Parental Investment

- Eggs, pregnancies, seeds, fruit are more expensive than sperm or pollen



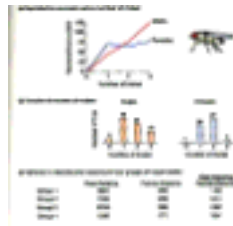
Asymmetric Limits on Reproductive Success

- A female is limited by the number of eggs, pregnancies, etc she can afford
- Renders more males than females ready to mate (skews "Operational sex ratio")
- Males are limited by access to females, but not vice versa

Bateman's Predictions and *Drosophila melanogaster*

Compared to females, males should have:

- Stronger correlation between # mates and # offspring
- Larger variance in number of mates
- Larger variance in number of offspring

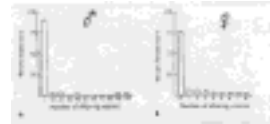


Elephant Seals



(Don't try this at home)

- Polygynous, dominant males (8 inseminated 348 females)
- Male $\geq 3x$ weight of female
- Males larger variance in reproductive success than females



Humans

- Moulay Ismail the Bloodthirsty had 888 children
- Anders Ödeen has one



But!

- Total number of matings don't differ between sexes; "it takes two to tango"
- Nonrandom variance in mating success matters to evolution by sexual selection – Highly successful males father disproportionately more offspring

(Any heritable trait they express will have higher than average fitness)

Parental Care

Why males desert broods

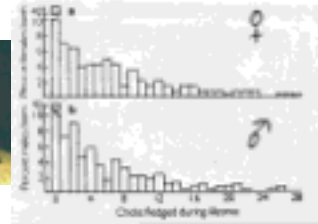
- *Highly successful* males (who matter to the evolution of parental roles) have higher reproductive rates than females and hence gain more future reproduction from deserting
- Sperm competition. For any given zygote, males have lower average parentage and hence benefit less from caring

(There is always a non-zero probability that he is not the father)



Male parental care

- Black-legged kittiwakes, monogamous, monomorphic, males care, similar variance in number of offspring



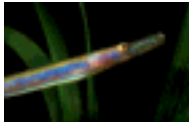
Parental Roles in Pipefish

Sea horse relatives

- Males provide all parental care
 - store and nourish eggs in brood pouch or patch



Syngnathus typhle



Nerophis ophidion

Consequences of Asymmetries

in parental investments and reproductive success

- Intrasexual selection:
 - Males compete
 - descend from competitive males, who had many matings and offspring
- Intersexual selection:
 - Females choose
 - # matings only marginally improves fitness
 - any mating is a large investment