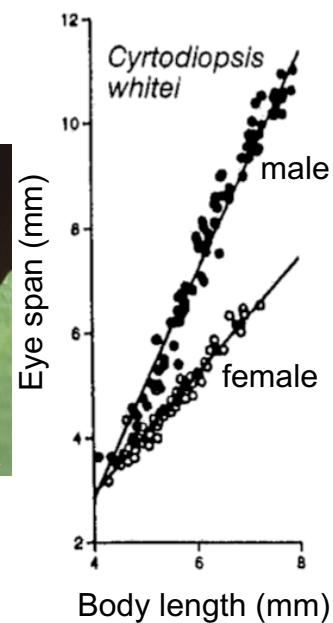


Lecture 5: Sexual Selection

How does sexual selection arise?

Coyne Chapter 5



Wilkinson & Dodson (1997)

Sexual Dimorphism

The sexes within a species differ in the expression of a trait

Sexual Selection

differences in reproductive success caused by competition over mates

Reproductive Success

the number of viable, fertile offspring produced by an individual

Competition

occurs whenever one user makes a resource less available for others

Natural & Sexual Selection

Sexual Selection

Two forms of sexual selection:

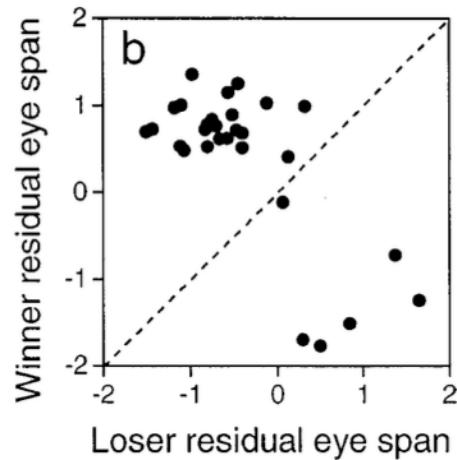
- ***Intrasexual selection***
- ***Intersexual selection***

Intrasexual Selection

selection for traits that increase an individual's ability to directly compete with members of the same sex for mating opportunities

- scrambles
- endurance rivalry
- contests
- sperm competition

Male-male contests in stalk-eyed flies



Palhuis & Wilkinson (1999)

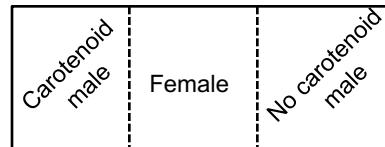
Intersexual selection

- selection that occurs when the effect of trait(s) expressed in one sex leads to non-random matings with members of the opposite sex

Female choice in guppies



Poecilia reticulata



	Carotenoid	No carotenoid
Female response (min)	3.35	1.61
Mating	1.42	0.35

Kodric-Brown (1989)

Why be choosy?

- Direct benefits
- Indirect benefit
- Species recognition
- Sensory bias



J Gallagher/Wikimedia

Sexual cannibalism in spiders

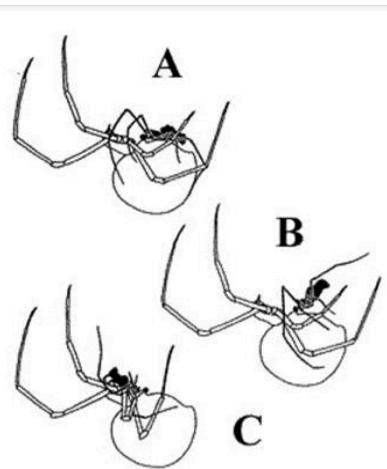


EEB Prof
Maydianne
Andrade



Redback spider
Latrodectus
hasselti

Sexual cannibalism in spiders



LM Forster (1992)

- A. Males stand on female's abdomen, abdomen-to-abdomen. Copulation begins once male inserts palp
- B. Male uses palp as pivot to move into headstand posture
- C. Male quickly turns 180° so his back is positioned over female's mouth

Sexual cannibalism in spiders

How could male self-sacrifice be adaptive
(i.e., affect male reproductive success)?

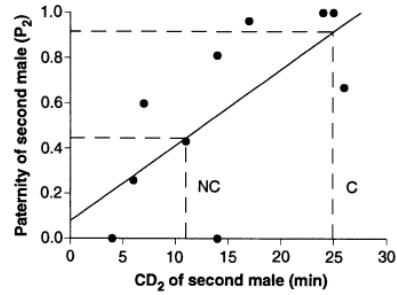
Sexual cannibalism in spiders

	Cannibalistic mating	Non-cannibalistic mating
Number of matings (<i>N</i>)	9	13
Egg sac mass (mg)	198	179
Number of eggs per sac	256	249

Andrade (1996)

Sexual cannibalism in spiders

- mated 1 virgin female to 2 virgin males
- recorded copulation duration (CD), cannibalism (NC or C), and measured paternity of second male



Andrade (1996)

Sexual cannibalism in spiders

	Rejected second male	Mated with second male
Ate first male	6	3
Did not eat first male	1	22

Sexual Selection

differences in reproductive success caused by **competition** over mates

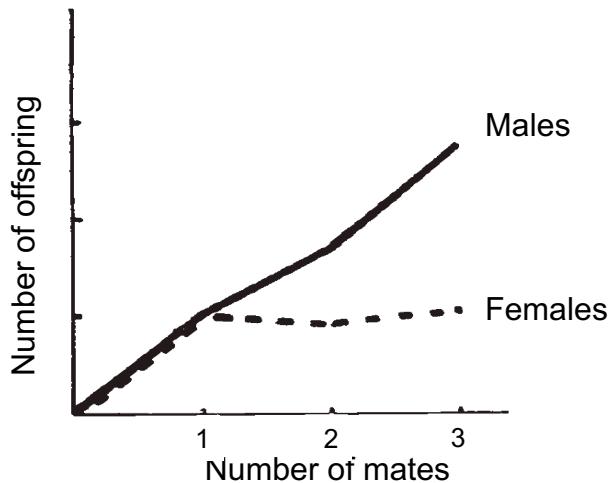
What creates this competition?

Why does selection act differently on the sexes?

Anisogamy

- In general, females have larger gametes that require more resources to produce than male gametes

Bateman's Curve



Bateman (1948)

Parental Investment Theory (1971)

Robert Trivers
Rutgers



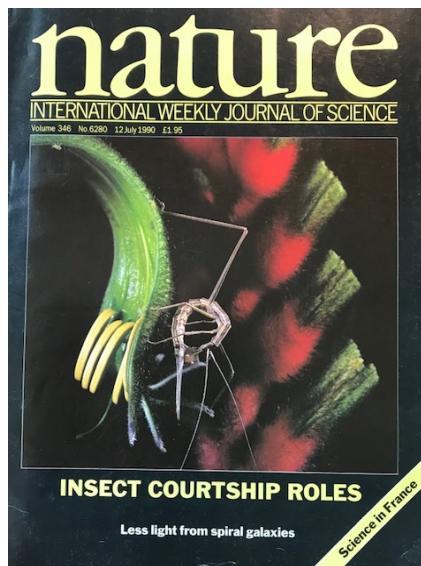
- Sexes differ in their *net reproductive investment*:
 - Gamete production
 - Mating effort
 - Parental care
- The sex that invests more in reproduction will be the *limiting sex*
- The *non-limiting sex* will compete for the limiting sex
- **Sexual selection will act on the non-limiting sex**

Sex role reversal

- Sexual selection on females:
 - female-female competition
 - male mate choice

Under what circumstances would sexual selection act on females?

Sexual selection in katydids



- increase size and number of female eggs
- increase male fertilization success



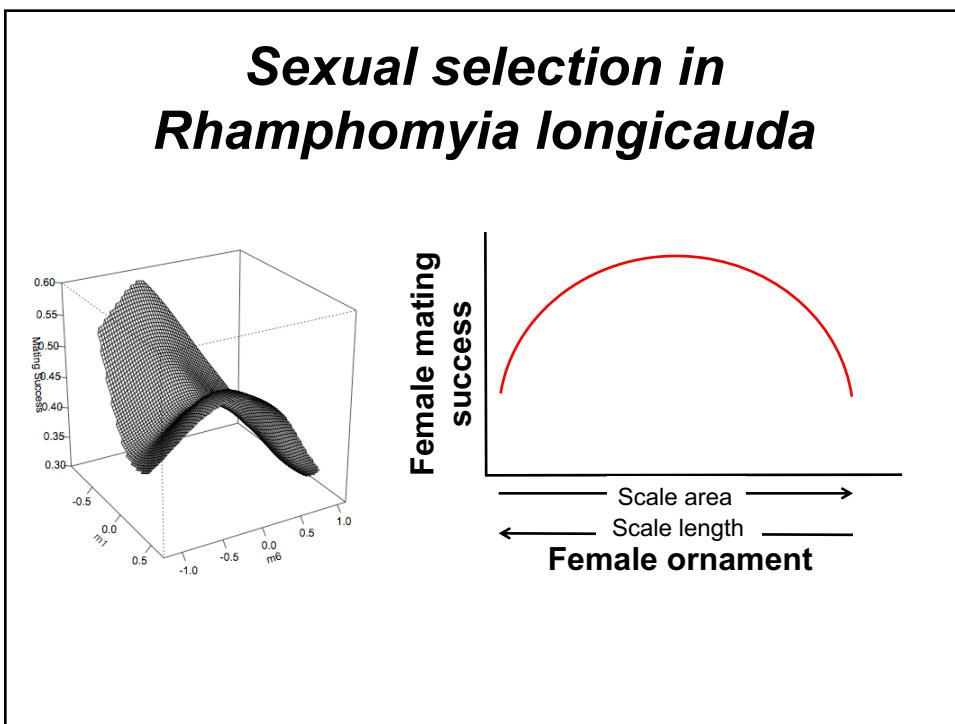
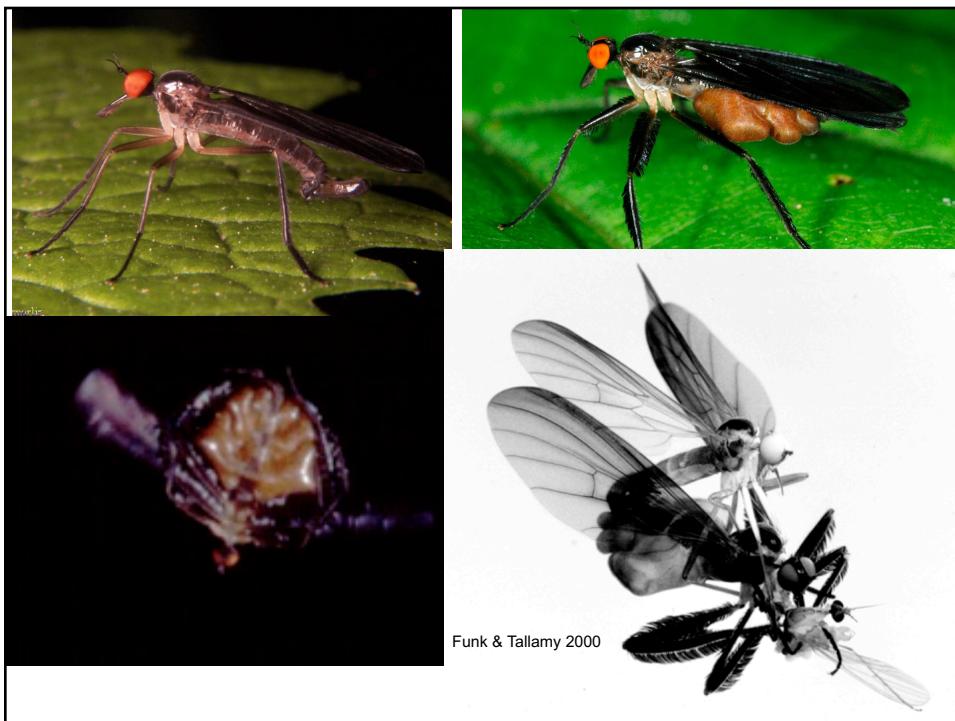
EEB Prof
Darryl Gwynne

How can we manipulate the cost of investment by males?

Sexual selection in katydids

	Spermatophore size	Calling males	Female matings	Male choice	Female choice	Female competition
Control						
Extra food						

Gwynne & Simmons (1990)



Rhamphomyia longicauda

- Is there sexual selection for female traits?
- What is causing sexual selection on females?