

Petrie et al. 1991

120 years after Darwin suggested female choice could maintain elaborate plumage:

First demonstration of female preference for elaborate plumage in males.

Underlying Theory:

- Intersexual Selection

Specific Hypotheses

1. Female mate choice depends on male plumage train characteristics (*intersexual sel'n hyp.*) versus
2. Certain plumage train characteristics confer a competitive advantage to males (*intrasexual sel'n hypothesis*)

Not mutually exclusive hypotheses

Previous Studies (Two)

- Experimental manipulations
- Demo'd increased mating success but didn't clearly document the mechanism

Observational Study

- One lek at Whipsnade Zoological Park (England)

Petrie et al. Observations

- Morphological measurements on males

- Train features
- Other body features

- Behavior at one lek

- Female visits
- Male courtship attempts (hoot-dash)
- Male interference and intrusion

- Results

- High variance in male mating success
 - Displaying males
 - Peripheral displaying males
 - Floating males
- Males did attempt to interfere with copulation attempts of other males
 - But interference did not seem to alter mating success
- Successful matings correlated with train morphology
 - Train size and eye-spot number
 - Not correlated with other body measurements or lekking position
- Data on 11 female visit sequences

Lekking

From Scandinavian word 'lek' for "play"

Males defend small territories of no resource value

- Typically clumped in a small display area
- Females arrive there solely for finding mates

Why do this? Bradbury's hypothesis

- Should be favored in species with wide-ranging foraging ecology
 - Unpredictable, temporally variable food sources (tropical fruits ripening at different times on different trees)

Big Question: Why do males congregate in small areas?

- Three Hypotheses:
 - "Hot Spot" hypothesis
 - "Hot Shot" hypothesis
 - Female preference hypothesis

Evidence for "Hot Shot"

- Great snipes (European sandpipers)
 - Removal of dominant males caused desertion by nearby subordinates
 - Removal of subordinates created rapidly-filled vacancies

Lekking is one example of various

Mating Systems

Inquiry into evolution of patterns of mating systems started fairly recently.

Definitions:

- gyny --> females
- andry --> males
- gamy --> both sexes

Monogamy, Polygyny, Polyandry, etc.

Polybrachygyny --> male "serial monogamy"

Defined in different ways:

Pair bonds versus ability to monopolize access to mates

Mammals and others: Polygamy far more common---interesting cases are monogamy

Birds: Monogamy quite common---interesting cases are polygyny and polyandry

- Black Grouse

- Yearly variation in lek sites

Evidence in support of Hot Spot:

- Multiple species lekking near river confluences

Evidence against female preference hypothesis:

- Uganda kob (an antelope that leks)
 - Operational Sex Ratio across leks is fairly constant

However, as with all things ecological: Depends heavily on the species.

- Ruffs (type of sandpiper) exhibit behavior supporting all three hypotheses

- Located near small ponds on elevated ground
- Females prefer groups with at least 5 displayers
- Low-ranking males choose to display near dominant males



Back to Peacocks...

Monogamy

Why would males ever be monogamous?

1. Mate Guarding Hypothesis

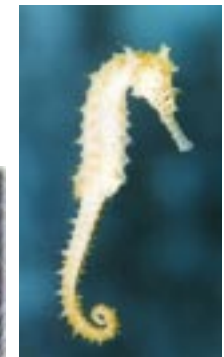
- Females may remain receptive after mating
- Females may be hard to locate
 - Clown Shrimp

2. Mate-Assistance Hypothesis

- Improvement in offspring survival with paternal care may be dramatic
- Seahorses
 - Male brood pouches

3. Female-Enforced Monogamy

- American Burying Beetle



Infidelity in Monogamous Matings

Rationale for extra-pair matings

Male perspective

- Costs: cuckoldry while he's gallivanting about
- Risks of searching for extra-pair copulations and contending with other mates
- Clear benefits

Female Perspective

- Possible Genetic benefits
 - Sufficient sperm quantity
 - Sperm competition (fitter sons if heritable)
 - Genetic variety
 - Sibs less likely to compete ecologically?
- Material benefits
 - Resources on extra male territories
 - Parental care

Male Response on Evolutionary Time Scale:

Paternity Assurance

Female defense polygyny:

- Pre-existing female clusters
 - Some bat species females forage together and roost together at night a single site in their cave
 - Single male defends these clumps
 - DNA studies: 60 to 90% of matings
 - Up to 50 pups per male!
- Some males form their own female clusters
 - Marine amphipod---constructs "mobile apartment buildings" with up to three females

Male dominance polygyny

- See lekking

Mechanisms of Paternity Assurance/Remating Prevention

Examples:

Dragonfly hitchhikers:

- Fly around on top of the female he's fertilized until eggs are laid



Calopteryx spp.

Plugs and cementious semen

Chemically noxious odorizing

Infanticide

- "Recently promoted" dominant primate males
- Female fetus resorption

The job of paternity assurance is more difficult in species where the female stores semen from previous males

- Solution in *Calopteryx maculata*---the hooked penis

Polygyny and Polyandry

Monogamy is the norm in birds

- Potential for male reproductive care (mate-assistance hypothesis) seems dominant reason
- Most theory about polygyny and polyandry developed in the context of bird studies

Resource-Defense Polygyny

•Polygyny Threshold (Gordon Orians)

- At some point it benefits females to become a second mate of a male with a large territory
- Lenington with red-winged blackbirds
 - Males arrive first and establish territories
 - Females appear later and choose males
 - Initial choice of unmated males
 - Eventually polygyny was chosen over mating with males on poorer territories
 - Two territory variables
 - Cattail density
 - Food density*