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 selection hypothesis) versus
2. Certain plumage train characteristics confer a competitive advantage to males (intrasexual selection 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)

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, temporarily 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

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

Evidence for “Hot Spot”
• Black Grouse
  • Yearly variation in lek sites

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

Mating Systems

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

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

Polygamy, 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
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

Mechanisms of Paternity Assurance/Remating Prevention

Examples:
- Dragonfly hitchhikers:
  - Fly around on top of the female he’s fertilized until eggs are laid

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 hooped 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*

Female defense polygyny:
- Pre-existing female clusters
  - Some bat species females forage together and roost together at night a single site in their cave
  - 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

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