This week in Animal Behaviour

- Lecture 14: Sexual selection II
- Lecture 15: Sexual selection III
- NO LAB... work on human project
- Text chapter 6
- ONLINE DISCUSSION #2: Homosexual behaviour in birds

How do animals choose?

Mechanisms of mate choice

Social learning is often involved

brown-headed cowbird *Molothrus ater*
Mechanisms of mate choice

Females can use multiple criteria
Mate choice strategies can depend on the individual, and on the context (e.g. house finches)

Perceptual effects can be involved
Weber’s law: as the magnitude of two stimuli increases, a larger difference is needed to distinguish them
The implication is that females should choose males based on the relative, rather than the absolute, difference in their traits...

Mechanisms of mate choice

Perceptual effects can be involved
Evidence: túngara frogs

Mechanisms of mate choice

Is a threshold pattern the result of Weber’s law?

Peahens prefer peacocks displaying more eyespots, but rarely

Roslyn Dakin*, Robert Montgomery
Department of Biology, Queen’s University, Kingston
Mechanisms of mate choice

Perceptual effects can be involved
Evidence: Great bowerbirds are masters of illusion

And what about us?

Forced perspective

Great bowerbirds did it first!

And what about us?

Somali man, ‘112’, weds girl, 17

Hundreds of people have attended a wedding in central Somalia between a man who says he is 112 years old, and his teenage wife.

Ahmad Muhammad Dore - who already has 13 children by five wives - said he would like to have more with his new wife, Safia Abdullahi, who is 17 years old.

"Today God helped me realise my dream," Mr Dore said, after the wedding in the region of Gelgutaad.

The bride's family said she was "happy with her new husband".
More than one way to succeed?

Bluegill sunfish at QUBS

Reproductive strategies

Do all individuals fight for access to mates?
Do all individuals have traits that mates find attractive?

Does everyone do the same thing, or are there different ways of getting the job done?

The competition as a game

If everyone is playing rock all the time, what should you do?

A population where all males use a single tactic, such as aggression, may not be evolutionarily stable, so that a mutation that gives rise to an alternative strategy can succeed and spread.

Terms of the game

**Strategy:** a genetically distinctive set of rules for behaviour; a fixed response pattern

**Tactic:** behaviour pattern where there is an option available to the individual; note that tactics are still enabled by an underlying hereditary mechanism

**Evolutionarily stable strategy:** a set of rules that, when adopted by the individuals in a population, cannot be replaced by an alternative
Alternative reproductive strategies

**Conditional strategy:** when individuals adopt alternative tactics based on environmental conditions (i.e., an inherited capacity to be flexible)

- the environmental conditions can involve an internal state or the social environment
- often one tactic is a “best of a bad job” scenario (i.e., not highest reproductive success overall, but highest possible for the individual under certain conditions)

Example: *Panorpa* scorpionflies

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<table>
<thead>
<tr>
<th>Male size</th>
<th>Percent matings involving Cricket</th>
<th>Saliva</th>
<th>Force</th>
<th>Percent of total matings</th>
<th>Number of males</th>
<th>% ± S.D. matings</th>
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<tr>
<td>Large</td>
<td>71</td>
<td>27</td>
<td>3</td>
<td>60</td>
<td>21</td>
<td>5.8 ± 1.8</td>
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<tr>
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<td>28</td>
<td>1.9 ± 1.9</td>
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<td>4</td>
<td>54</td>
<td>42</td>
<td>13</td>
<td>21</td>
<td>1.2 ± 1.6</td>
</tr>
</tbody>
</table>

Enclosures containing four crickets (N = 170 matings)

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<tr>
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</tr>
</thead>
<tbody>
<tr>
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<td>89</td>
<td>11</td>
<td>0</td>
<td>48</td>
<td>21</td>
<td>3.9 ± 0.9</td>
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<tr>
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<td>37</td>
<td>28</td>
<td>2.3 ± 1.8</td>
</tr>
<tr>
<td>Small</td>
<td>4</td>
<td>58</td>
<td>38</td>
<td>15</td>
<td>21</td>
<td>1.2 ± 1.4</td>
</tr>
</tbody>
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Conditional strategy

Example: dung beetles major and minor males

Males with poor nutritional history develop into the minor phenotype (no horns, sneak matings)...

...but minor males also have huge testes to flood out the competition.

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Conditional strategy

Example: *Panorpa* scorpionflies

- defend insect
- defend salivary gift
- force copulation

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Conditional strategy

Example: dung beetles major and minor males

Males with poor nutritional history develop into the minor phenotype (no horns, sneak matings)...

...but minor males also have huge testes to flood out the competition.

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Conditional strategy

Squirrel males can either be active-pursuit or satellite, depending on the number of competitors

Bullfrogs can switch from caller to sneaker behaviour depending on age and body size
Conditional strategy

Example: horseshoe crabs attached and satellite males

Distinct strategies: differences are based on a genetic polymorphism; individuals cannot switch
- the polymorphism can be maintained by negative frequency dependent selection

Example: alpha, beta, gamma males in sponge isopods

Sex on the...

Example: horseshoe crabs attached and satellite males

satellite = “best of a bad job”

Alternative reproductive strategies

Distinct strategies: differences are based on a genetic polymorphism; individuals cannot switch
- the polymorphism can be maintained by negative frequency dependent selection

Example: alpha, beta, gamma males in sponge isopods

Distinct strategies

Example: ruffs
males can be territorials, satellites...

Genetic polymorphism for alternative mating behaviour in lekking male ruff
Philomachus pugnax
David A. Lack, Cynthia M. Smith, Olivier Massé, Jerry Benner & Fred Cooke
Distinct strategies

...and female mimics!
female mimic testes size = 2.5 x

Alternative mating strategies

Conditional strategy:
• differences induced by environment
• individuals are potentially capable of either behaviour (in other words, they use different tactics)
• mean reproductive success for individuals adopting different tactics does not have to be equal

Distinct strategies:
• differences can be traced to genes
• mean reproductive success should be equal at evolutionary equilibrium

Maintaining the alternatives

Case study: side-blotched lizards
males can have orange, yellow, or blue throats

Real life rock paper scissors?

O males aggressive, short-lived, fight B males
B males recognize and beat up Y males
Y males mimic females and get by O males
Real life rock paper scissors?

Strategies are evolutionarily stable through negative frequency dependent selection

- each type benefits when another type is common

![Diagram showing relative fitness of rare morph](image)

Summary

1. Sexual selection can explain the evolution of sexual dimorphism
   - intersexual selection = mate choice
   - intrasexual selection = within-sex competition
2. There are several models that can explain the benefits of mate choice (and these are not mutually exclusive)
3. In many cases, the mechanisms of mate choice are unknown
   - imprinting, social learning and perceptual biases may be involved
4. There can be more than one way to succeed
Next week in Animal Behaviour

- Lecture 16: Mating systems I
- Lecture 17: Mating systems II
- Lecture 18: Parental care
- LAB: Project 1 help session
- Text chapter 7-8
- ONLINE DISCUSSION #3: Networking crows