Assortative mating for fitness in *Drosophila melanogaster*

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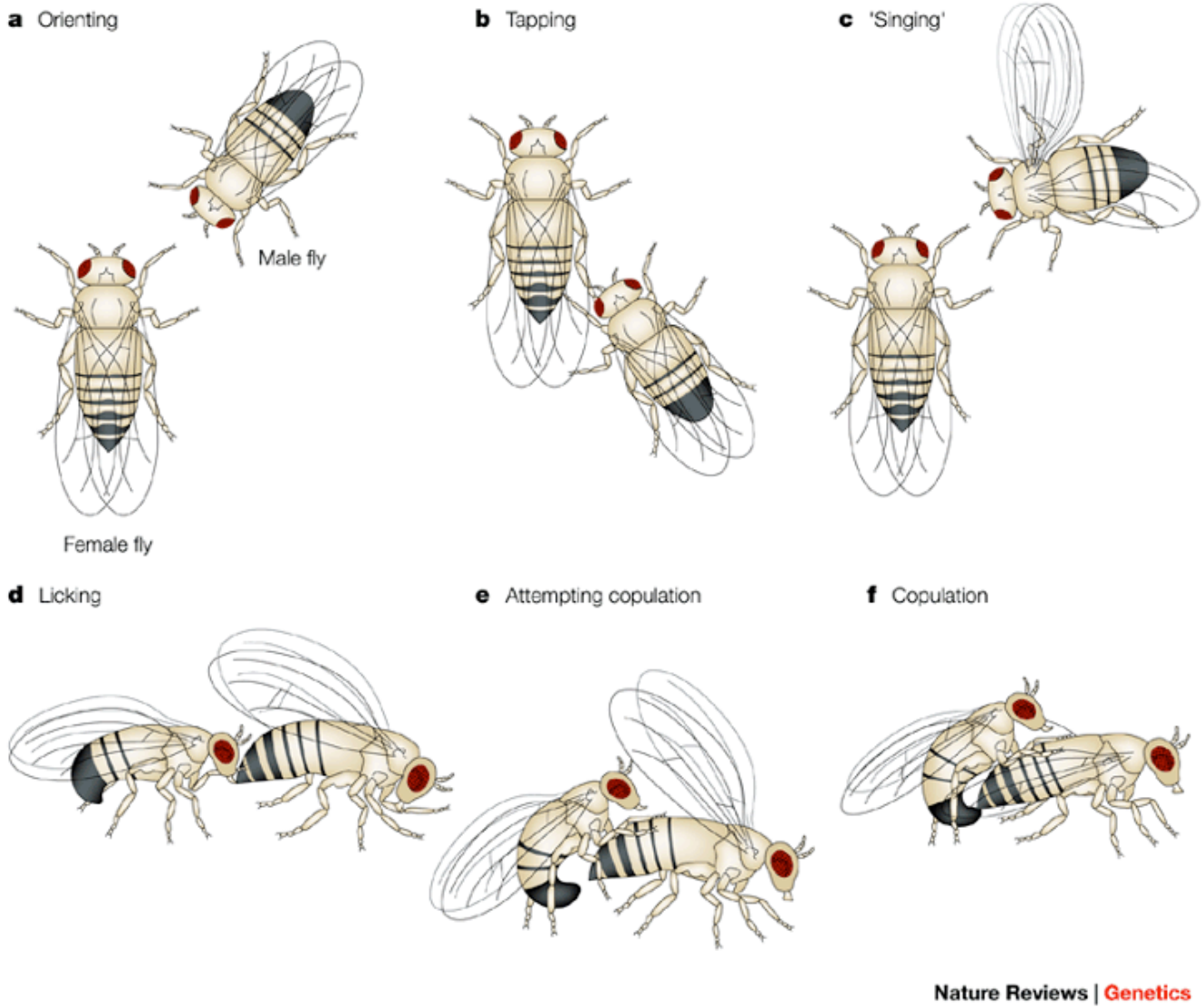
- *Sexual selection*: when some individuals are more likely to obtain a mating partner than others, they will have higher *fitness*
- In other words, contribute more offspring to the next generation

- Several forms, including:
  - male-male competition
  - female choice

Assortative mating for fitness in *Drosophila melanogaster*



Assortative mating for fitness in *Drosophila melanogaster*

URL: http://www.youtube.com/watch?v=zXXqQ2zJVMA

Assortative mating for fitness in *Drosophila melanogaster*

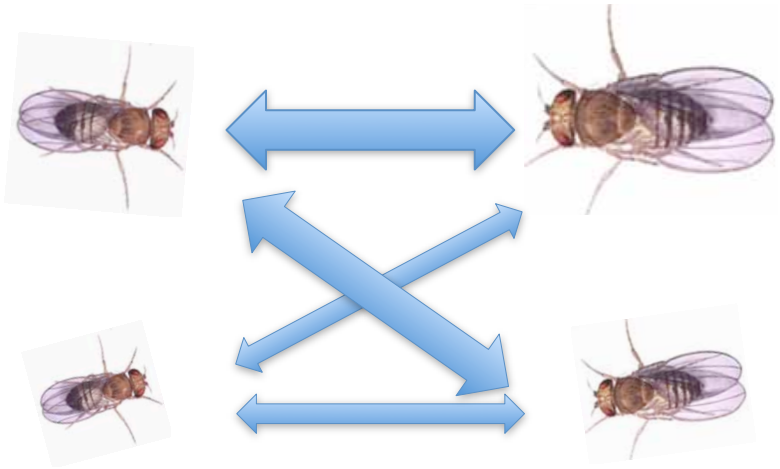
URL: http://www.youtube.com/watch?v=avG3sxmMvq4

Assortative mating for fitness in *Drosophila melanogaster*

- Some males might get more mates than others, because of sexual selection
- But *which* mates do they get?
- *Assortative mating*: when the mating pattern is not random

Assortative mating for fitness in *Drosophila melanogaster*

- *Assortative mating*: when mating is not random



Mating pattern is random

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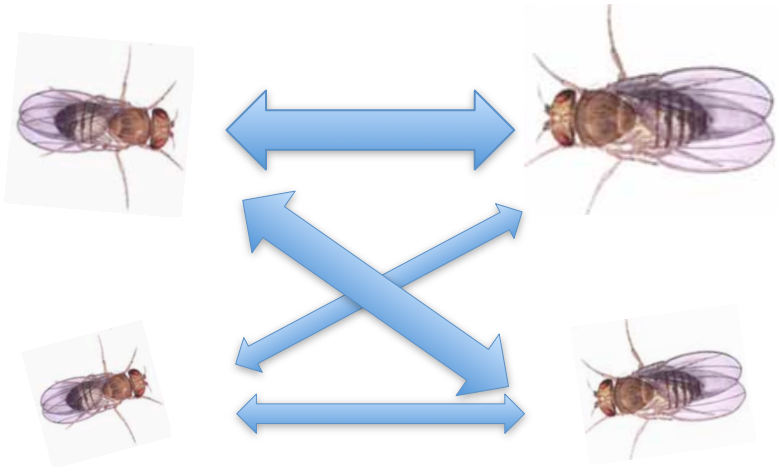
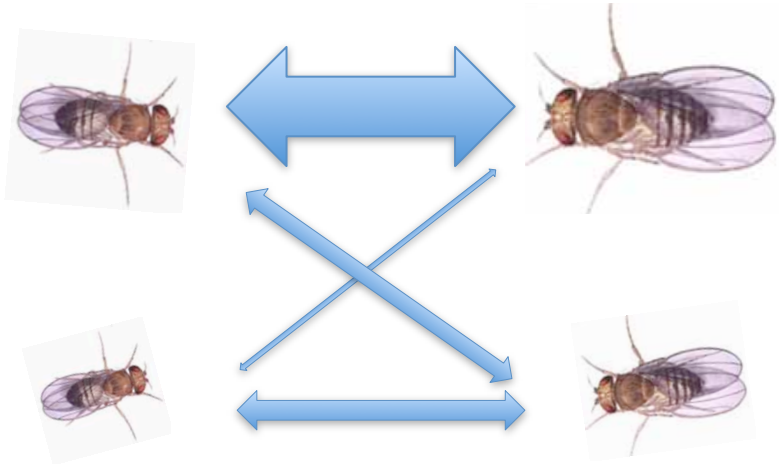
- *Assortative mating*: when mating is not random



Mating pattern is random



Non-random mating pattern

Assortative mating for fitness in *Drosophila melanogaster*

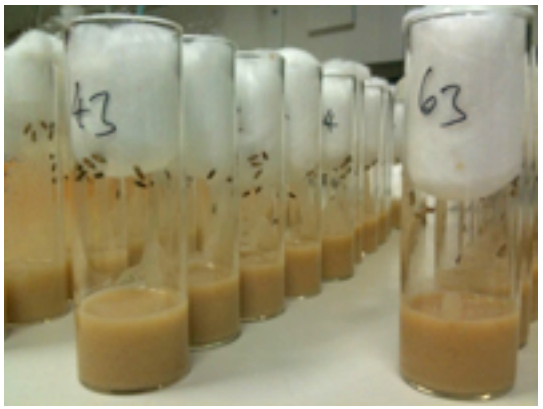
- *Assortative mating*: when mating is not random

- Assortative mating for *fitness*: mating more likely between individuals with similar fitness

Assortative mating for fitness in *Drosophila melanogaster*

- Assortative mating is expected to have several effects:
- Increased variability in fitness among offspring
- Accelerate adaptation to changing environmental conditions
- Increase the productivity of a population

Assortative mating for fitness in *Drosophila melanogaster*



- Goal: test for non-random mating for fitness in flies.
- Methods:
  - a large number of 1-hour mating trials
  - each with one virgin female and two virgin males
  - males different colours due to diet
  - some flies given less food: low condition ≈ low fitness
  - assess number of eggs/mating success to confirm that diet manipulation affected fitness

Assortative mating for fitness in *Drosophila melanogaster*

- Record whether **H** male or **L** male mates first, when female is either **H** or **L**.

Trials with **H** female

H male

H female

L male

Trials with **L** female

H male

L female

L male

Assortative mating for fitness in *Drosophila melanogaster*

- Predictions:

1) **H** females will be more fit than **L** females.

2) **H** males will be more successful than **L** males overall.

3) **H** males will be most successful with **H** females.

Trials with **H** female

H male

H female

L male

Trials with **L** female

H male

L female

L male

Assortative mating for fitness in *Drosophila melanogaster*

- Results:

1) Confirmed. **L** females laid 40% fewer eggs than **H**.
2) Confirmed. **H** males mated more than **L** regardless of female condition.
3) Confirmed. **H** males were more successful with **H** females than with **L** females.

Female condition	Low male success	High male success	% High male success
Low	113	146	56.4
High	94	182	65.9

Assortative mating for fitness in *Drosophila melanogaster*

- The diet manipulation created differences in fitness.
- **H** males were always more likely to be successful, and their advantage was greatest with **H** females.
- Thus, mating was non-random: **H** x **H** and **L** x **L** more common than expected under random mating.

Female condition	Low male success	High male success	% High male success
Low	113	146	56.4
High	94	182	65.9

Assortative mating for fitness in *Drosophila melanogaster*

- If assortative mating for fitness is common, it could:
  - Help populations adapt to changing conditions
  - Reduce the risk of extinction in small populations

Female condition	Low male success	High male success	% High male success
Low	113	146	56.4
High	94	182	65.9