



Weird sex (including lack of it)

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Have you ever seen a weird bee with drone bits and worker bits?

- If you have, it was a GYNANDROMORPH!



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GYNANDROMORPH



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Gynandromorphs

Chimeras comprised of both male and female tissues



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How do bee gynandromorphs arise?

- 2-3 sperm enter every honey bee egg
- Following fertilization the extra sperms should die.
- But sometimes they don't...

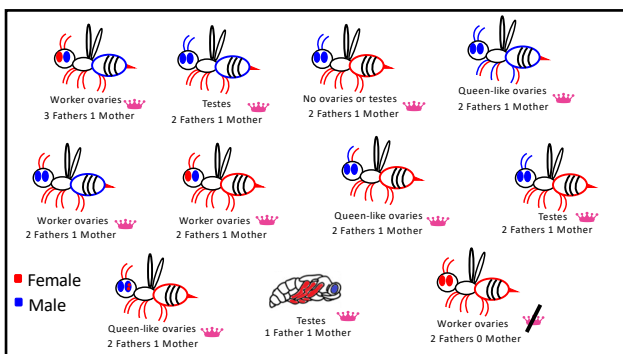


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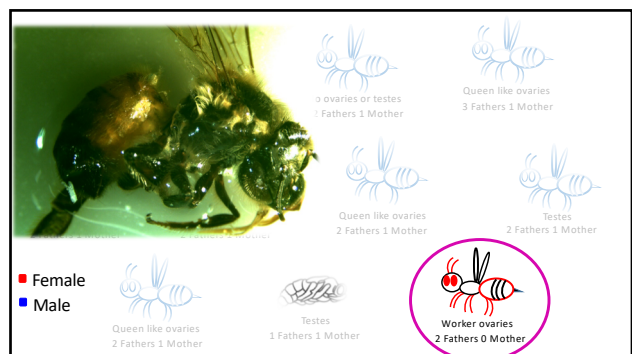
- We found 11 peculiar (gynandromorph) emerging bees in a colony in Richmond
- Dissected
 - Genotyped to determine the origin and sex of the tissue



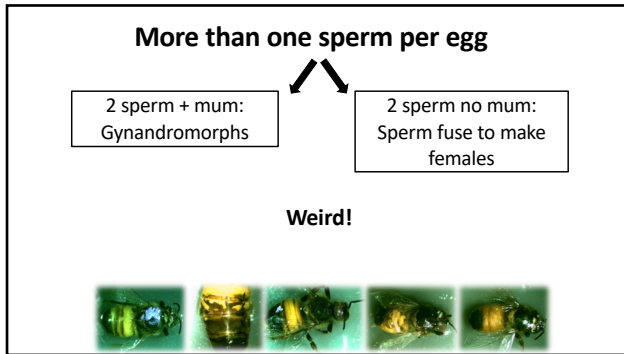
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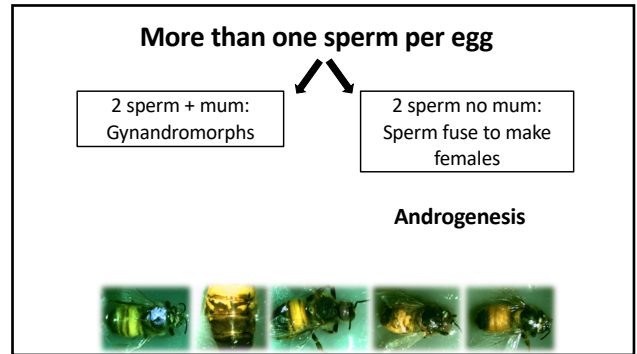
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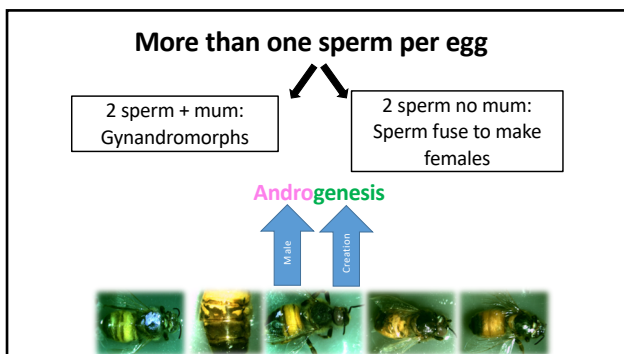
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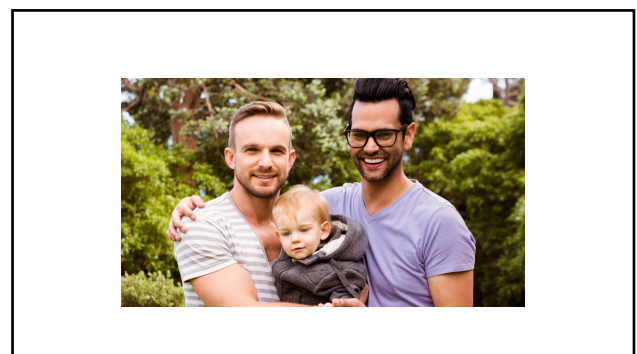
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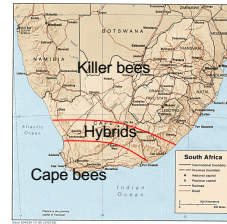
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More bee weirdness: Do you remember the Cape bees of South Africa?



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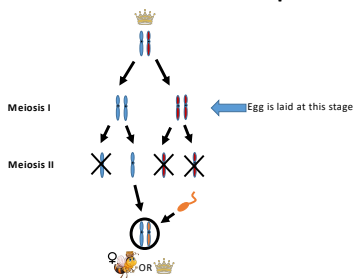
South Africa is home to two honey bee subspecies



Beekman, Allsopp, Wesseler, Oldroyd (2008) Heredity 100: 13

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Normal (non-weird Australian) sexual reproduction in bees

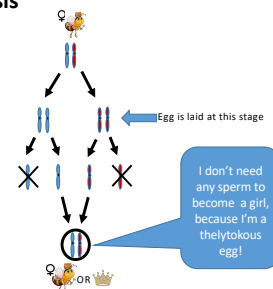


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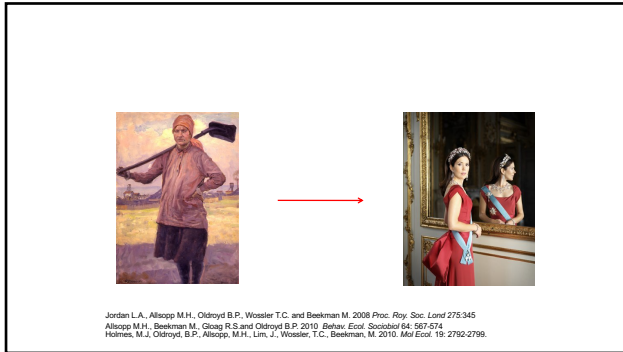
Thelytokous (weird South African) reproduction in Capensis



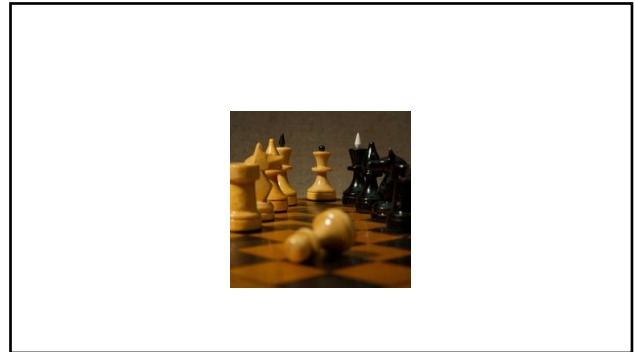
- 50% of queens are worker laid
- 50% of worker-laid queens are parasites from other colonies



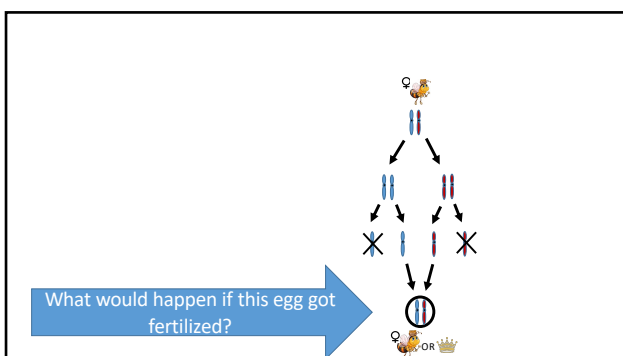
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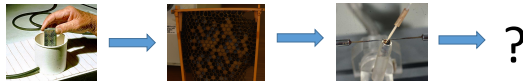
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Capensis **queens** don't lay thelytokously

- Only workers
- But you can induce thelytoky in virgin queens with CO₂ narcosis

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Experiment



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After AI up to 1/3 of progeny laying virgin Capensis queens were triploid: both copies of mum's chromosomes and 1 copy of dad's.

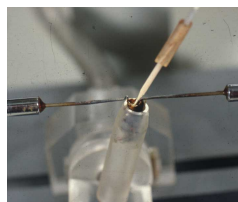
I've got three sets of chromosomes. (But I should only have 2)



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We later found out that simply AI-ing a Capensis queen produces 1/3 triploid progeny.

Remember that you need CO₂ to keep the queen still during the operation.



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Revision: What's the difference between a triploid bee and a gynandromorph bee?

Gynandromorph

- Two sets of chromosomes in some cells, one set in others
- Mixed male and female tissue

Triploid

- Three sets of chromosomes in every cell
- Always female

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Meet AI 93, Green-73.

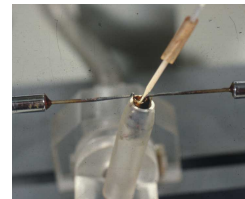


Hey BICWA conference, I'm triploid. But otherwise I'm a very normal bee. Check out my beautiful eggs on the left!

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Is it the Carbon Dioxide (CO₂) or the laying without mating that makes triploids?

- When we simply AI Capensis queens, up to 1/3 of progeny are triploid.
- But AI needs CO₂
- So maybe its just CO₂



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What would happen if I gassed an old lady?

- Not a lot
- A couple superseded
 - Most stopped laying for a while
 - No triploids
 - So CO₂ doesn't seem to be the cause.
 - But maybe CO₂ only induces triploidy in virgins?

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We need a plan to induce virgin Capensis queens to lay eggs without CO₂ narcosis

- Virgins that fly and interact with drones start laying, even though they have not mated.
- What we need is a bee chastity belt.



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