

# Eusocial Behavior = Eusociality

The presence of castes.

Caste = a specialized level in a colony of social animals in which members carry out a specialized job.

Characterized by:

1. Reproductive division of labor → permanent
2. Overlapping generations
3. Cooperative care of young
4. Caste polymorphism



# Why/How would eusociality evolve?

1. Kin selection
2. Ecological constraints
3. Life history constraints

# Honey Bees





**Worker**

- Non-reproductive females
- Make up 95% of colony
- “run” the hive



**Drone**

- males
- make up 5% of colony
- hang out and wait to mate with a virgin queen



**Queen**

- reproductive female
- only 1 per hive
- lays all the eggs



Workers

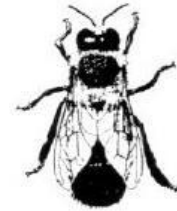
Queen



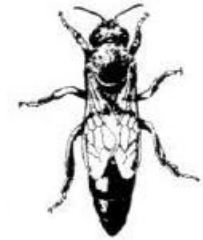
1. Reproductive division of labor
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Worker



Drone



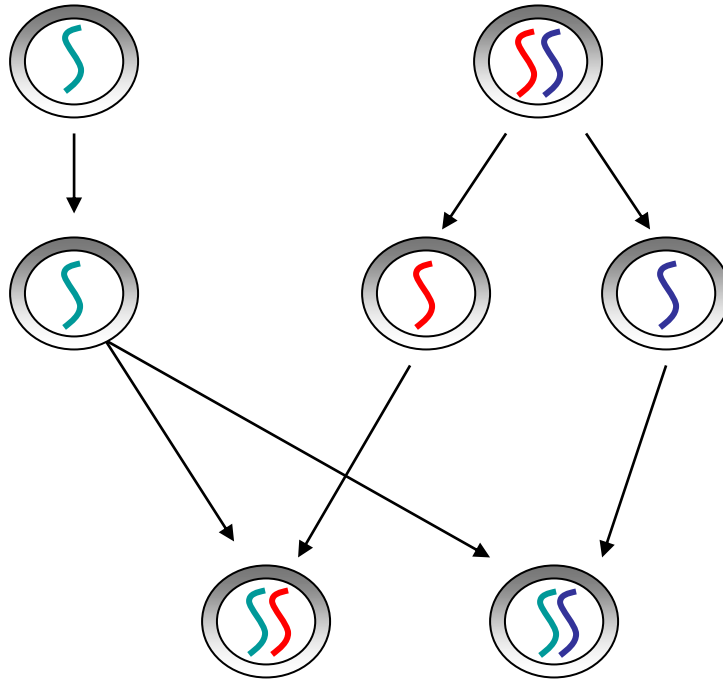
Queen

Why/How would eusociality evolve? → Kin selection

# Haplodiploid Reproduction

Male = drone

Female = Queen

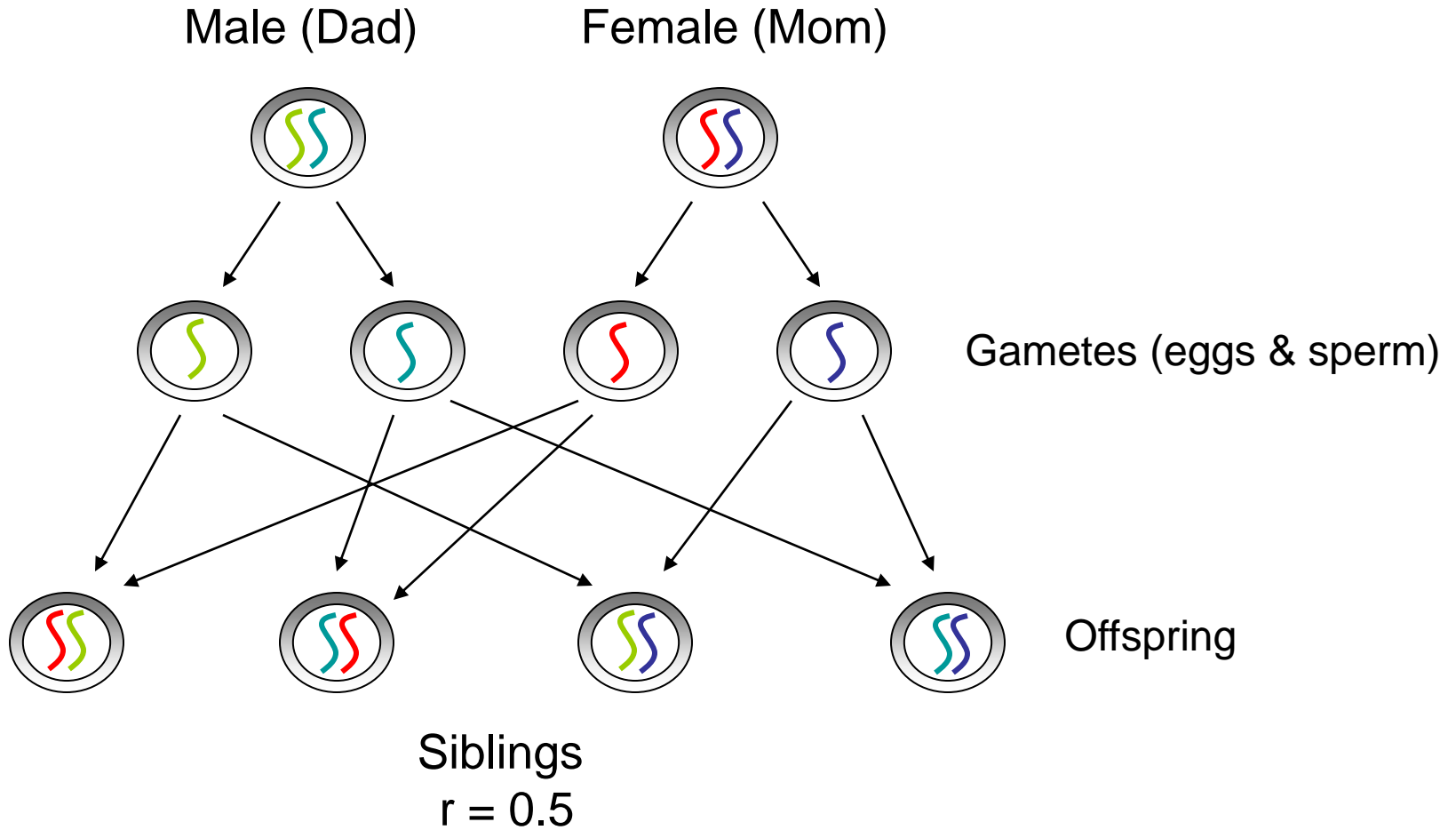


Gametes (eggs & sperm)

Offspring

Workers & new queens

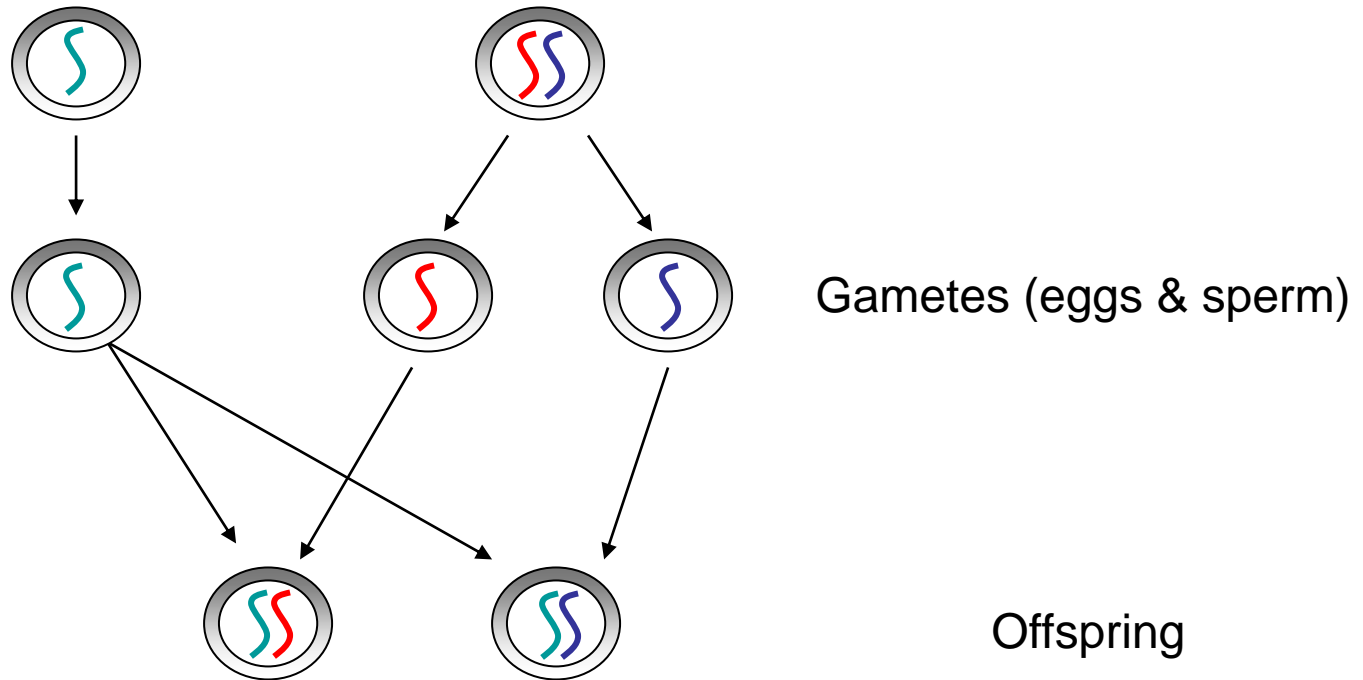
# Diploid Reproduction



# Haplodiploid Reproduction

Male = drone

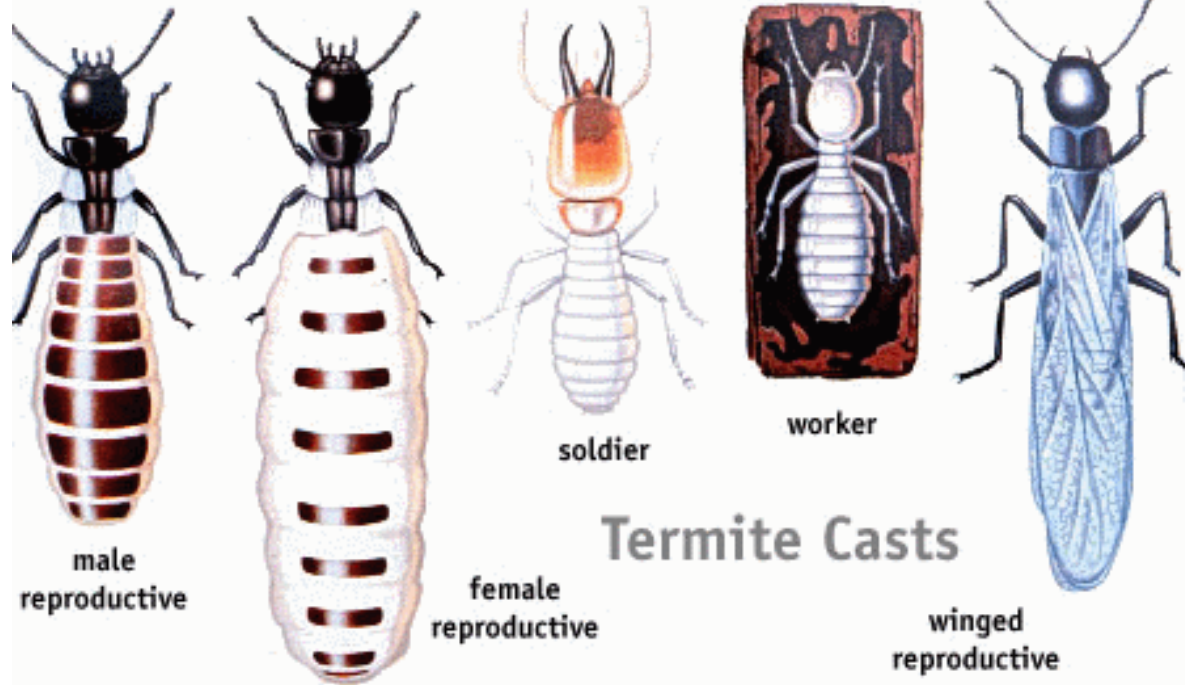
Female = Queen



Workers & new queens  
 $r = 0.75$

Sisters are more closely related to each other than they would be to their own offspring

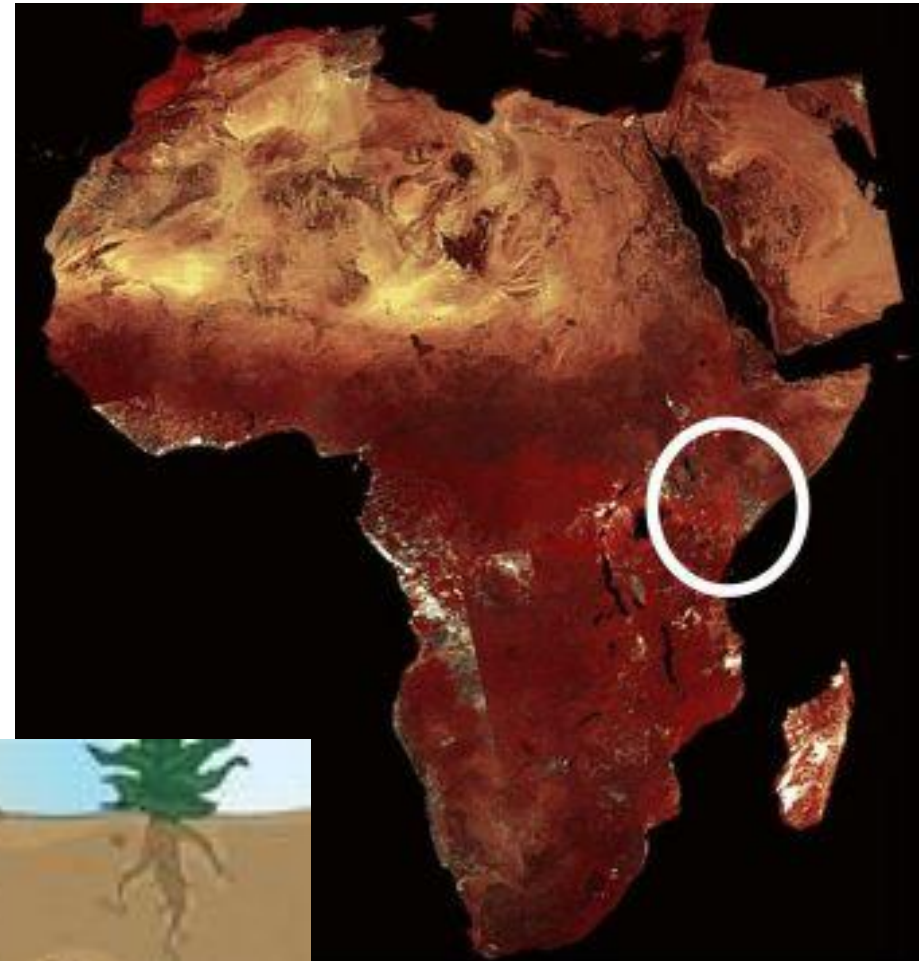
# Termites



Why/How would eusociality evolve?

1. ecological constraints → rare food source
2. life history constraints → require extended parental care

# Naked Mole Rats



Queen

Queen's harem



Soldiers



Workers

## Why/How would eusociality evolve?

1. kin selection → colonies highly inbred →  $r = 0.8$
2. ecological constraints → harsh environment & rare food source
3. life history constraints → maternal manipulation

