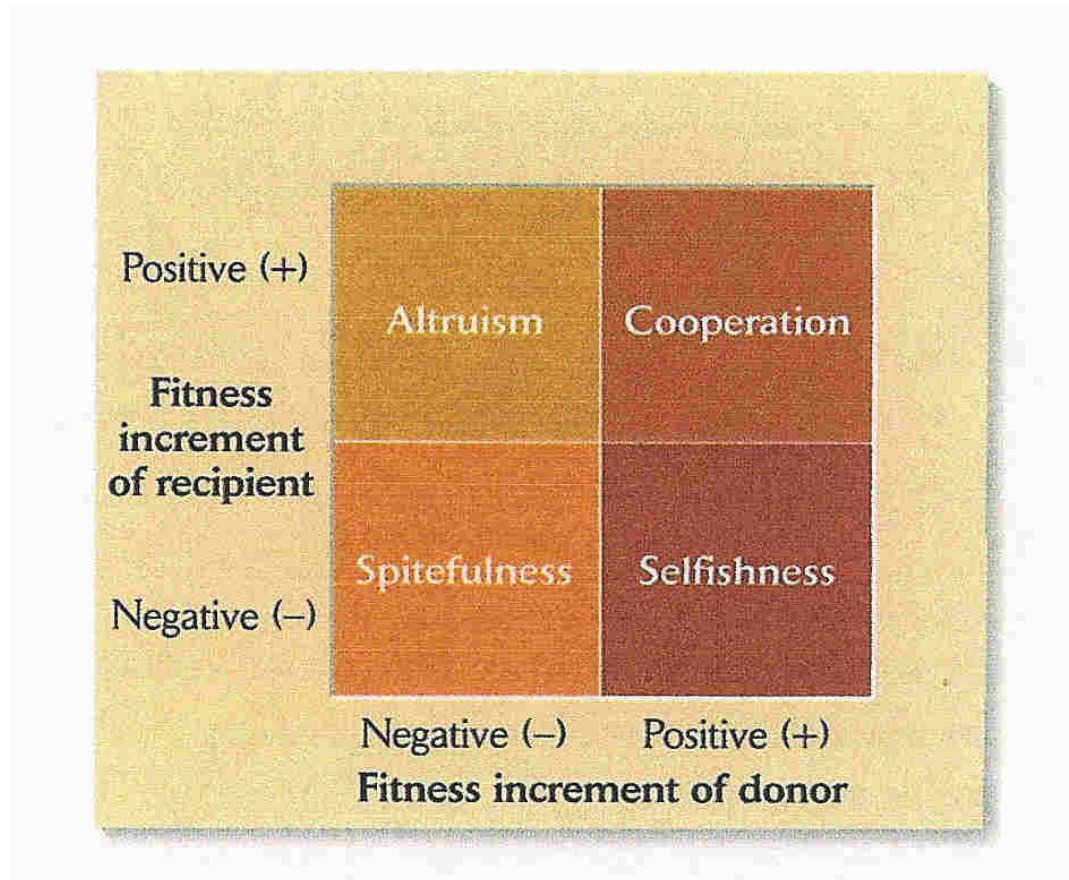


# Sex, sociality and behavior (Social behavior)

# Social behavior

- Includes all kinds of interactions between individuals of the same species, from cooperation to antagonism. During its lifetime, each individual interacts with mates, offspring, other relatives and unrelated members of its social group.

# Types of social behavior



# Importance

- Social relations are important since they often directly impact the reproductive contribution of individuals to future generations, thus they impact evolutionary fitness and the abundance of organisms in a population

# Selfishness

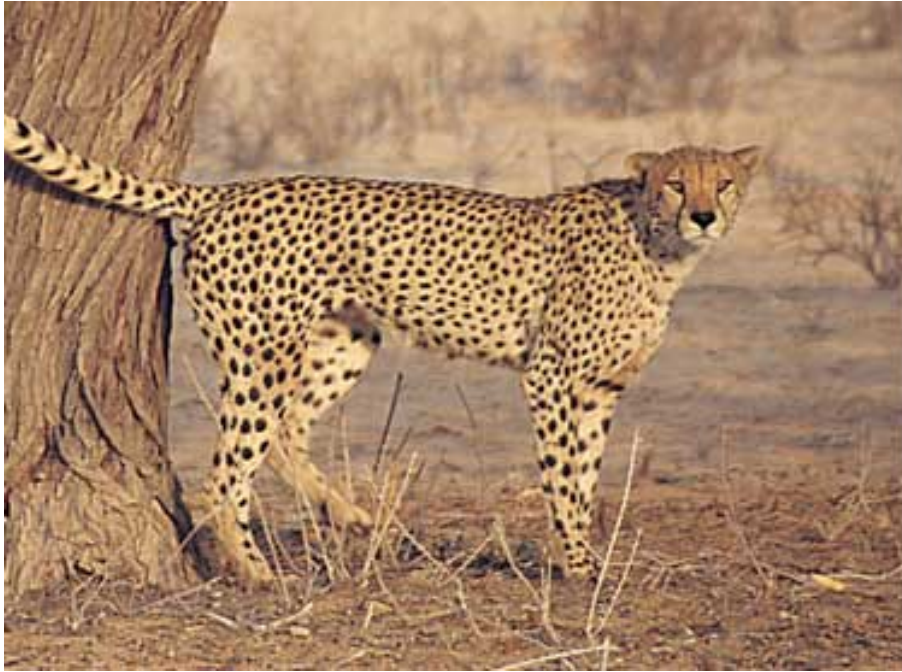
- Territoriality: contests in which organisms defend an area used for feeding, mating or rearing young.
  - Territory: any area defended by an individual. They may be transient or permanent
- Dominance hierarchy: contests in which organisms define social rank among each other to establish access for resources
  - It is usually linearly ordered; usually occurs on organisms that establish social groups

## Territories: gannets nesting



## Staking out territory with chemical markers

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# Dominance hierarchies among mountain goats and stallions

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# Altruism

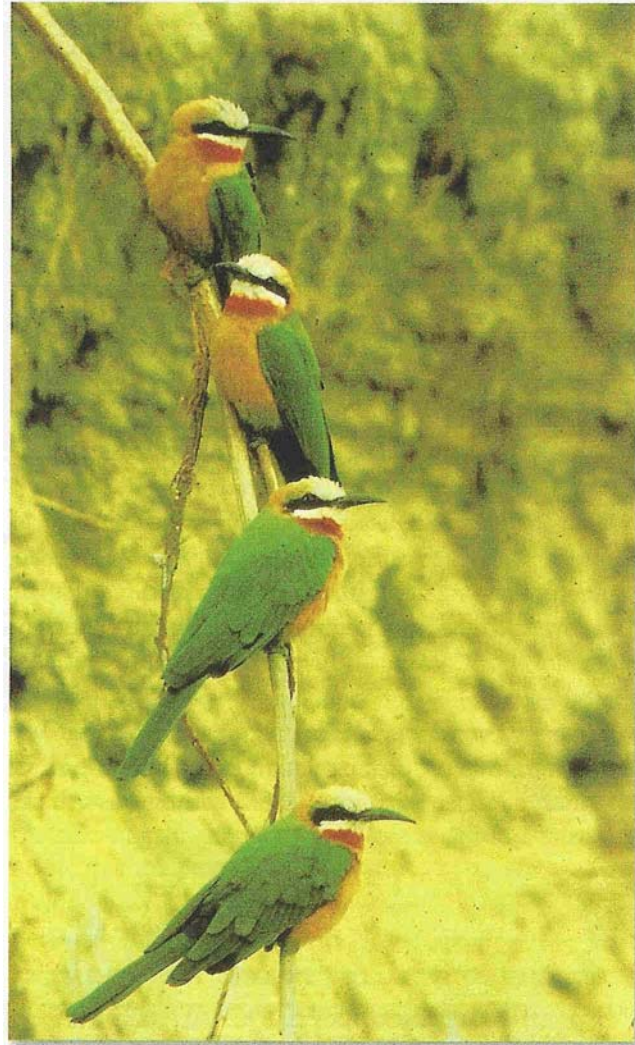
- Best examples involve individuals that do not reproduce themselves, but help others in the population to reproduce (eusociality)
- This behavior has evolved among species w/ discrete family units; e.g.: termites, leaf-cutter ants, naked moles

Two species of colonial mammals: naked mole rats and common mole rat



# Cooperation

- Best examples involve individuals that often cooperate and help during the process of producing offspring
- It usually occurs among species living in extended family units; e.g: 100 spp of birds (green woodhoopoes, white-fronted bee-eater) and some mammal spp (wolves, wild dogs, African lions)



White-fronted bee-eater

# How can these behaviors evolve?

- Inclusive fitness: overall fitness of an individual determined by its own survival and reproduction plus the survival and reproduction of individuals with whom the individual shares genes
- Kin selection: natural selection that favors diverting resources to kin under conditions where the benefits to the helper exceeds the costs

# How can these behaviors evolve? (Continuation)

- Cooperative breeding may improve helper's own probability of successful reproduction (both aspects of inclusive fitness are increased)
- Eusociality does not enhance reproduction of helpers (decreases it) but kin is more genetically similar than own offspring thus by enhancing fitness of relatives, helpers enhance their own fitness

# Sexual selection

- It is the selection for particular traits in individuals that result from engaging in mate choice by one sex and/or competition for mates among individuals of the same sex
  - Darwin proposed this type of selection to try to explain the evolution of secondary sexual characteristics
  - Sexual selection can lead to sexual dimorphism

# Sexual selection (cont.)

- Competition for mates among individuals of the same sex
  - Usually occurs among males
  - Favors the evolution of elaborate weapons (antlers of elk, horns of mountain sheep) and larger body size for combat (lions, deer, elk)

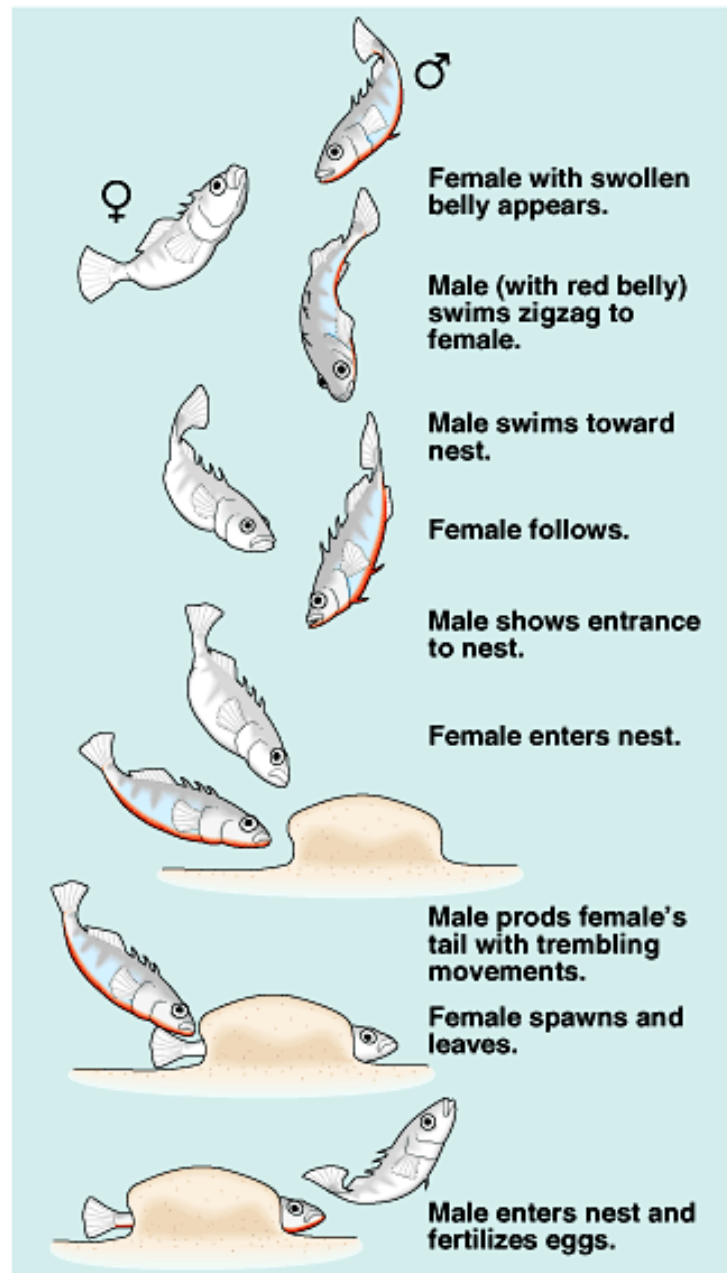
Mountain goats and stallions fighting to determine better access to resources and mates



# Sexual selection (cont.)

- Mate choice
  - Usually females are the choosy sex. Why?
  - Promotes elaboration of anatomical or behavioral traits that are used by the choosy sex to discriminate among potential mates
    - For example, if females choose based on song quality or brightness of plumage coloration, males might become brighter over time and songs more elaborate

# Courtship behavior in the three-spined stickleback



# Male stalk-eyed fly



# How can sexually selected traits indicate individual quality?

- The handicap principle suggests that elaborate male secondary sexual characteristics act as handicaps since they are costly to produce and bear.
- Females will prefer to mate with males that confer higher quality to their progeny
  - Example: brighter coloration in plumage or longer ornamentation may be related to genetic capacity to resist parasite infection