Wild horses: the “hired gun” hypothesis

Shackleford Banks, barrier island off coast of eastern US.

No preds, abundant fresh water, veg varies in quality.

Horses exhibit a variety of relationships:

Some F form long-term bonds with other females and closed groups, others only loose, temporary bonds and ephemeral groups.

Some M solitary or bachelor groups, some tend females, some strongly territorial with harems.

Equus caballus
Eastern end: best habitat, strong female groups, territorial males
Western end: poor habitat, no permanent associations among females or males

Western end: patches of good grass (marshes and swales) small and patchy, prevents long-term associations, lots of fission-fusion of groups
Eastern end: good grass areas permit long-term group formation, but don’t force it, and no preds here to lead to group formation…

See graphs and table in handout
Benefit of group formation in this case seems to be related to nature of male-female interactions.

Reproductive success increases where males defend territories.

Solitary, roaming, and non-territorial males tending female groups involved in more aggressive encounters than territorial males.

Most important, females can feed better and care for young better when not disrupted or harassed. Move to areas and form larger groups where territorial male keeps others away.

Better RS for individual females, better RS for territorial males. Key in this case: females responding to male distribution (and male-male interactions) rather than vice versa.
Why do lions form prides?

Panthera leo

Prides = 3-12 adult females and offspring, 1 but more often a few males.

• Usually no recruitment of outside females, all highly related, grow up in pride.

• All females can breed (no suppression of reproduction); may even suckle other cubs (high synchrony helps).

• Lots of fission and fusion of subgroups. Females defend pride territory, males defend females from other males.

• Young males forced to disperse at about 3 yrs old.

• New coalition of males takes over pride every few years, often kills cubs, evicts all males.
Groups of lions do not take larger prey or get higher per capita food intake (max. efficiency = 2 lions)

But...

• Cooperative hunting can reduce risk of injury, less energetically costly.
• Groups can defend carcasses from other groups and other species.
• Communal cub rearing can reduce risk of infanticide.

Key factor in places like Serengetti: Open habitat means kills attract a lot of attention. Prefer large prey; can feed several, so cooperate with kin to defend carcass.
Within groups, all sorts of complex interactions and relationships can occur...

Different sexes, separate societies: gray kangaroos

Macropus giganteus
Largest marsupial, most sexually dimorphic.

Open habitats, grass eaters, very loose social organization.

Small groups, but may be up to 50 in local area that meet and interact (groups often meet and join at times) = mobs; membership fluid, mixed sexes, very mobile, not territorial, size of groups varies with pop. density...

Except when there is a female coming into estrus!

Female in estrus followed by train of male “escorts”... chases, fights among males...largest, dominant male follows closest, chases others off. Female attractive for up to a week as estrus approaches, only mates during a few hours at peak estrus.
Female strategy: attract attention, resist for long time, assure most dominant male is mate. When not in estrus, hangs out with other females and young, usually relatives. Concentrates on parenting.

Male strategy: 1) Alpha rank usually only lasts a few years (avg. = 1), may not be gained until around 10 yrs of age, spend early years trying to gain max. growth and survive until strong enough to challenge for alpha spot. Lots of sparring with other males as matures, gets more intense with age, often moves away from group to hang in bachelor groups away from larger males. 2) Challenges for alpha rank intense, can cause severe injury, even death. Once attained, alpha male moves around among groups, monitoring females, asserting dominance, siring most (all!) offspring in area much larger than an individual could control as a territory.
African elephants: a matrilineal society

1. **Family group**: old matriarch, up to 10-20 related females, offspring. Social bonds may last for >50 yrs. Juv may suckle from females other than mother, other females (esp younger ones) show great concern and care for young. Family acts as single defensive unit.

2. **Kin group**: Several family groups that remain in same vicinity, often led by sisters or cousins, mingle peacefully.

3. **Clan**: Temporary large groups that form during, e.g., migrations, no real social cohesion.
Some elephant biology:
- Live 60-70 yrs. (like human!)
- Gestation 22 mo., births about every 4-5 yrs.
- Females start around 18 yrs old (earliest recorded about 13 yrs).
- Senescence (menopause) in mid to late 50s, but remain in group as leaders! Can enhance survival of family groups during times of environmental stress.

- Females remain in natal group (philopatry). Large groups may divide.
- Males leave group at about 12-14 yrs, may retain some affiliation but usually independent by age 14-16.
- Once mature, males (bulls) have annual reproductive cycle with elevated testosterone, high aggression towards other bulls for a few months per year, called musth. Become loners during this time. Infrasonic rumbles (lots of other infrasonic communication as well).
- Males asynchronous within pops (cycles individual based). When not in musth, may associate in small groups, may have long-term relationships.
- Teenagers need grown-ups!!! (young males rowdy)
Spotted hyenas: female-dominated societies

- Clans: can be large, up to 80 individuals (avg 3-5 in Namib Desert, 47 in Serengeti). Can be fission-fusion as conditions change.
- Lots of scent-marking. Individuals can be killed in border disputes.
- Not just scavengers, kill up to 95% of own prey. Steal prey from other carnivores. Disputes with lions – larger group often wins (4-1 advantage in numbers goes to hyenas), except advantage if male lions in group.
- Can digest bones! Feces white from calcium.
- Group hunting, but small groups… kills noisy, attract other clan members, so try to eat as fast as possible (can attract large number in short time!).
Reproduction

- Lifespan up to 25 yrs in wild. Female may breed at about 2-6 yrs old depending on social status. Bear twins (usually, 1-3 range).
- All females in clan can reproduce but higher ranking have more litters and higher survival of cubs.
- Give birth in isolated underground dens, but after a few weeks bring young to communal dens. Can be up to 30 young of different ages. Communal defense of dens but mothers only nurse their own young. Lact lasts about 14 months… long time, to allow development of strong, bone-cracking jaws.
Female dominance and mimicry of male genitalia!

- Females larger than males and dominant. Complex dominance hierarchies within clans, young inherit status of mothers (mothers interfere in early conflicts among young in clan).
- Females form networks of relationships, both hierarchical and alliances. Clans have multiple matrilines.

- Female genitalia mimic males: clitoris large and erectile, looks like penis, labial folds form sacs full of fibrous tissue to mimic scrotum. Leg lift like males during social encounters. Urinate, copulate, and must give birth through pseudopenis! Tears during parturition to permit birth.
Female dominance and mimicry of male genitalia!

- Social rank: adult females, then cubs (get status from mothers), then males.
- Resident (natal) males usually not accepted as mates by females. Most males disperse at about 2 years age. Immigrant males come into clan at bottom of social hierarchy, gain status by being attentive to dominant females, maybe attain matings that way.
- Coercive mating not possible (female physical structure, larger size), all mate selection done by female choice.

No accepted hypotheses yet for how or why this occurred!
Naked mole rats: a eusocial mammal

- Fossorial rodent, 20-30 g, hairless
- Live in insect-like societies.

*Heterocephalus glaber*

- Division of labor (smaller = maintenance work, tunneling, food gathering, etc.; larger = colony defense; breeders)
- 1 reprod. female = largest in colony; 1-3 reprod. males
- Burrows about 3.5 km, rock-hard soil, safe, thermally stable
• Only “queen” breeds, all year, huge litters (14 avg.), 4-5/yr.

• Non-reproductives help tend pups, bring food

• Non-reproductives live about 1 yr, queen is oldest, lives up to 16 yrs in captivity

• High degree of inbreeding, new reproductives recruited from within colonies

Feed on subterranean storage organs of plants; widely dispersed, located during burrowing. Can only dig extensively when soil is moist after unpredictable rains in limited rainy season.

Chance of locating food increases with more diggers, colony must locate enough reserves during short tunneling season to last through droughts.
Study questions:

1. What is the “hired gun” hypothesis, and how is it an example of how intraspecific interactions (behavior) can lead to group formation?

2. Living in a group could bring several disadvantages to an individual, as well as several advantages. Describe the basic social organization and benefits of group-living for African lions or naked mole rats.


4. What are the advantages of group formation by the spotted hyena? What is so unusual about the social organization of this species?