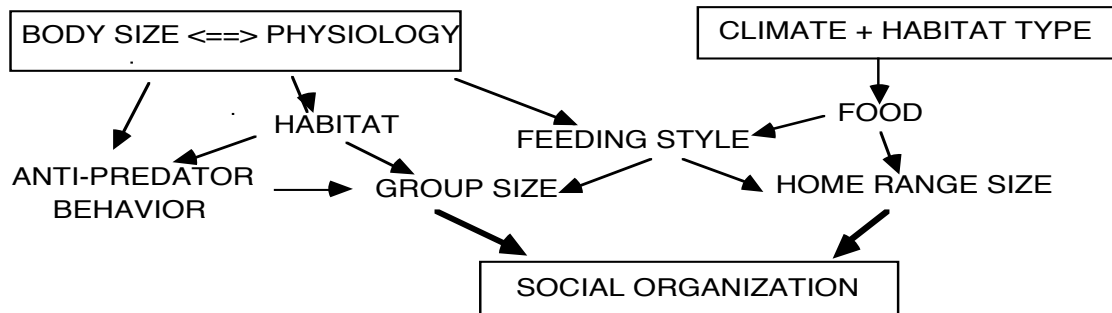


Bio 45 – Lect., 3-09 - Ungulate Biology and Social Systems

I. Ecology, Biology and Antelope Social Organization

Peter Jarman (1974 - Behaviour 48:215-267) outlined various factors affecting the basic social organization of African artiodactyls (even toed herbivores -- antelope, buffalo).

FACTORS THAT INFLUENCE SOCIAL ORGANIZATION -- JARMAN



Related to this flow chart, he made a list of changes that occur across a range of habitats:

Habitat →	Forest	Scrubland	Plains
Body Size (example)	Small size (dikdik)	Medium size (gerenuk, gazelle)	Large size (buffalo)
Feeding type	Selective browsers	browser/grazer	grazers
social system	Solitary or pairs	groups	herds
competition	Feeding territory	mating territory	social dominance
predator defense	Hide	flee	flee / defend

Thus living out in the open forces the compromise between protection from predation and increased social competition. Another way to look at it is that complex social interactions with dominance hierarchies do not work well in forests when you can't see what the others are doing.

II. Digestive systems of “Horses” and “Cows” - Impacts on their behavior

1. Different digestive systems - different demands on foraging time and food eaten

A. Ruminants (fore gut fermentors) - antelope, deer and cows

- retain food in gut longer, process it more -- picture cows chewing their cud...
- can specialize on getting more out of rarer, high quality food (browsers)

B. Non-ruminants (hindgut fermentors) - horses and elephants

- process food quickly, get little out of it - bulk feeders (grazers)
- must forage much of the time -- how often have you seen horses lying around?
- do better on lower quality food (e.g. dry grasses, old leaves)

III. Horse Social Behavior -- The impact of lactation, water and the cost of males

1. Horse social structure varies from mother-foal pairs to groups of a stallion plus mares and young (and herds of “bachelor males”). Previously, males were thought to round-up females into so-called harems. Actually, females form the groups themselves.

- Lactation is very costly to females -- they need sufficient food and water.
- Since mares must spend a lot of time feeding, being chased by males may be a large cost to females and favors associations of females. Males fight to associate with female groups and may offer some degree of protection from other males.
- When a new male displaces the herd stallion, he will often harass females and attempt repeated matings. Females are likely to abort in these situations (not known if it is spontaneous - female does it, or induced - male responsible).

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2. Several studies of wild asses and zebras reveal interesting effects of wet and dry habitats on group structure and dynamics **between** and **within species**.

A. Plains zebras versus Grevy's zebras (Rubenstein and Ginsberg)

1. Wet areas - **plains zebra** - female groups - male guards group.

- female groups fairly permanent, females share a home range
- females + foals = basic social unit ;
- they probably group for predator defense and to reduce male harassment
- from the male perspective this is called female defense polygyny !!??

2. Dry areas - **Grevy's zebra** - ephemeral male-female associations

- water critical for pregnant and lactating females. Foals get water from milk
- males have large territories near water - females "wander through"
- female and foal = basic unit ; associate with male to avoid harassment (?)
- from the male perspective this is called resource defense polygyny !?

B. Feral asses in Death Valley and Osabau Island, GA - (Patricia Moehlman)

1. **Dry area** - 9.2 cm rain per year -- browsers - selective diet

- **group** = female + young - stay near water. Lactation = all foal's water 1st 2-3 mo.
- males control access to water -- females avoid males unless they need water
- temporary association with male. Reduces interference with feeding

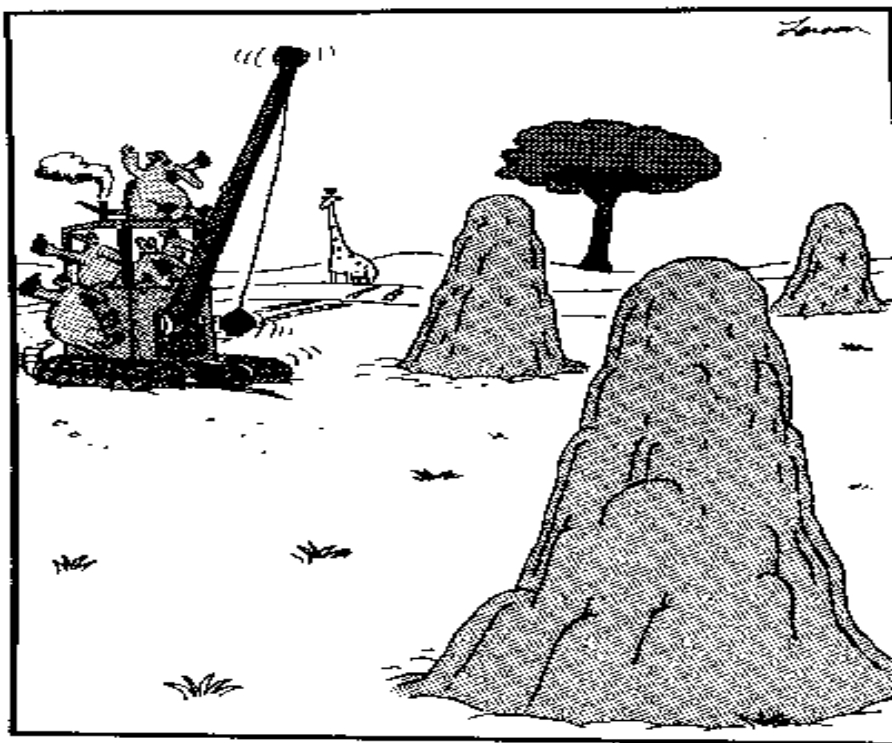
2. **Wet area** - 124 cm rain per year - grazers - broad diet

- **group** = females and young + male -- females bonded, mutual grooming
- group for predator defense, reduced male harassment, and reduced foal injury
- males follow and compete with each other for association with females

IV. Elephants - Extended female families with seasonally shifting group structure

1. Matriarch female plus daughters, grand-daughters, nieces, etc.

- Wet to dry season shifts in group structure -- big group to smaller units
- Males associate temporarily with groups - attracted by long range female calls
- Reproductive suppression among females but also some cooperative care



Like frozen sentries of the Serengeti, the century-old termite mounds had withstood all tests of time and foe—all tests, that is, except the one involving drunken armadillos and a stolen wrecking ball.