

## Tule Elk Natural History Notes

### An Elk by any other Name

- Elk
- American elk
- Red deer
- Wapiti
- *Cervus canadensis*



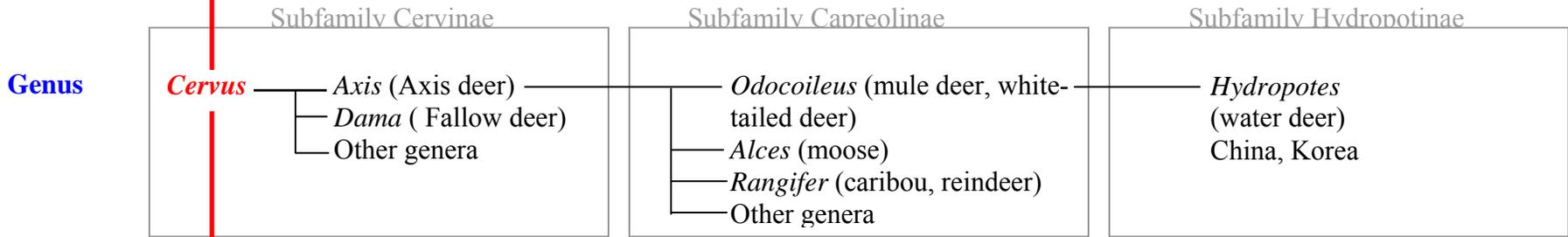
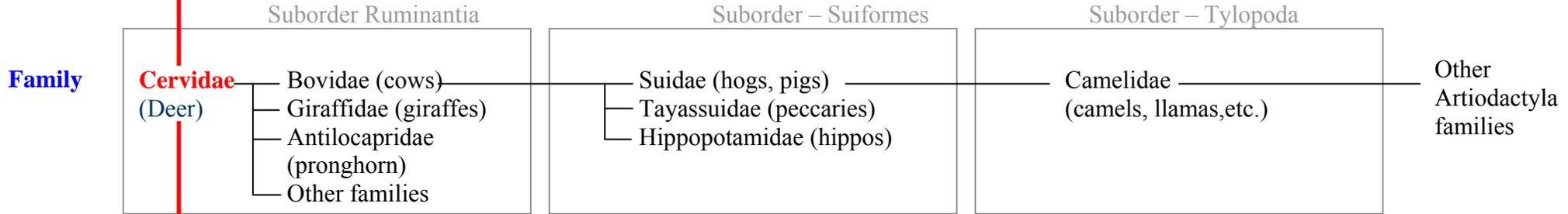
### *Cervus canadensis*

- Member of the Deer Family
  - Closely related to fallow and axis deer
  - Less closely related to black tail deer, moose, caribou, and reindeer

# Elk Classification

Kingdom Animalia → Phylum Chordata → Subphylum Vertebrata → Class Mammalia

**Order** **Artiodactyla** (even-toed ungulates) ————— Perrisodactyla [odd-toed ungulates (horses, rhinos, tapers)] ————— Other Orders (primates, carnivores, cetaceans, elephants, bats, rodents, etc.)



**Species** ***Cervus canadensis*** (elk, American elk, red deer, wapiti) ————— *Cervus nippon* (Sika, Japanese deer) Japan ————— *Cervus unicolor* (Sambar) northern India ————— *Cervus timorensis* (Rusa) southeast Asia ————— Other *Cervus* species

**Subspecies** ***C. canadensis nannodes*** (Tule Elk) — *C. canadensis roosevelti* (Roosevelt Elk) — *C. canadensis nelsoni* (Rocky Mountain Elk) — *C. canadensis manitobensis* (Manitoba Elk) — *C. canadensis canadensis* (Eastern Elk) – extinct — *C. canadensis merriami* (Merriam Elk)-extinct — Other *C. canadensis* subspecies

### What are elk?

- Class Mammalia - mammals
- Order Artiodactyla – even-toed ungulate
- Suborder Ruminantia – ruminant
- Family Cervidae - antlers

### Distinguishing Characteristics

- Large mammal
- White rump
- Males have long, dark mane
- Males have antlers, females do not



### Distribution

- *Cervus canadensis* distributed throughout North America, Europe, Asia
- Originated in Asia, migrated over Bering land bridge into North America, and occupied temperate areas to the edge of Mexico

### Migration into California (next page)

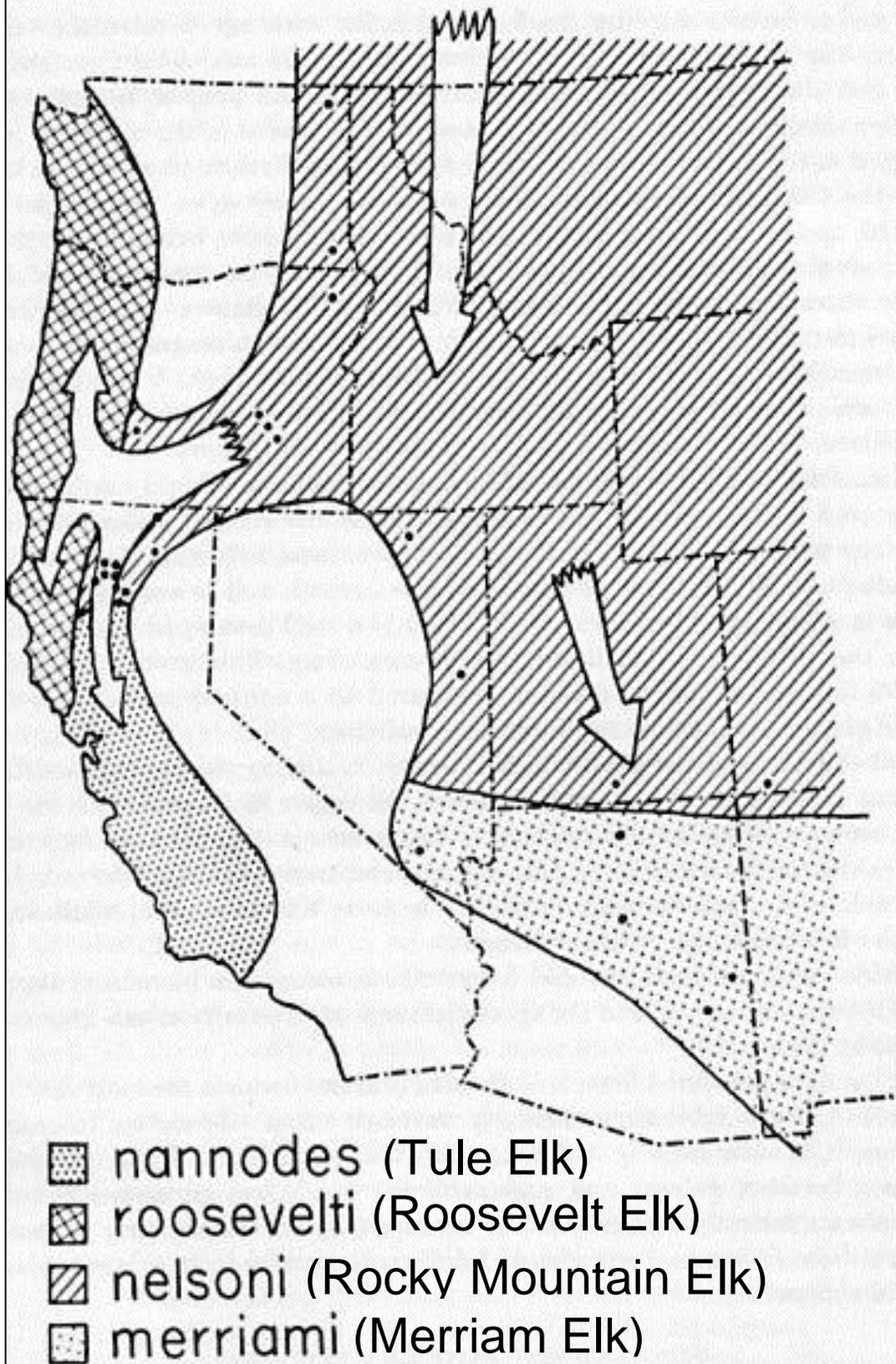


Fig. 2. Probable spread of elk in western North America based on early records of *nelsoni*. Localities are given in Appendix B.

## Habitat Characteristics

- Coast Ranges
  - Moderate to heavy rainfall
  - Mix of forest and open areas
- Central Valley
  - Low rainfall
  - Open grassland

Differing habitats led to specialization and evolution of subspecies.

- Subspecies include:
  - Tule elk (*Cervus canadensis nannodes*)
  - Roosevelt elk (*Cervus canadensis roosevelti*)
  - Rock mountain elk (*Cervus canadensis nelsoni*)
- On a continuum, Rocky mountain elk exhibit intermediate characteristics while Tule elk and Roosevelt elk exhibit characteristics at opposite ends of the continuum. Therefore, Rocky mountain elk may more closely resemble the generalized form of elk that migrated into North America which then specialized in opposite directions to form Tule elk and Roosevelt elk in differing habitats.
- Tule elk are more specialized than Roosevelt elk are with respect to Rocky mountain elk.

See the following charts and map:

***C. canadensis* subspecies comparison** (next 2 pages)

**Original Distribution in California** (next third page)

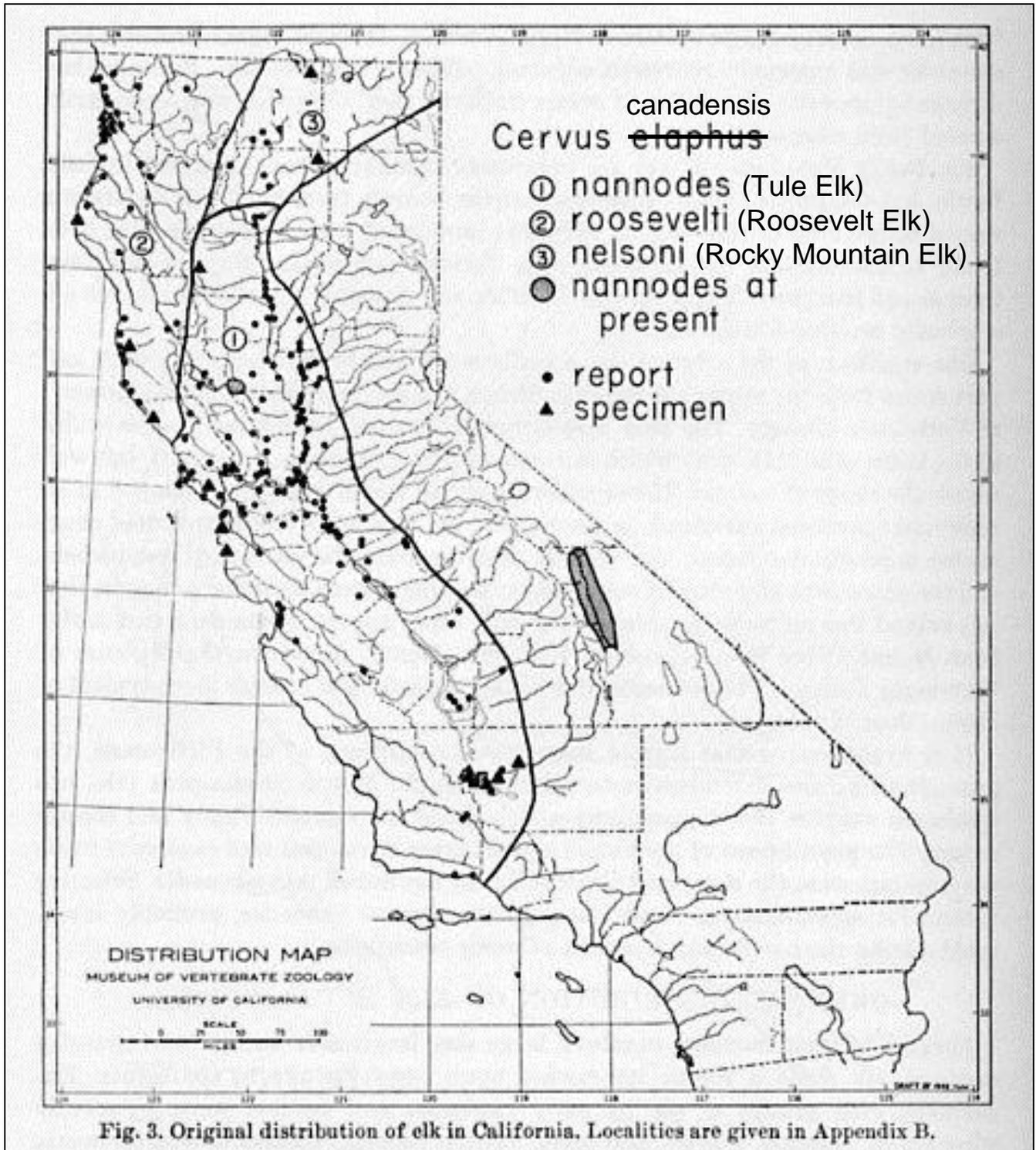
	<b>Tule Elk</b> <i>Cervus canadensis nannodes</i> <i>(most specialized)</i>	<b>Rocky Mountain Elk</b> <i>Cervus canadensis nelsoni</i> <i>(generalized)</i>	<b>Roosevelt Elk</b> <i>Cervus canadensis roosevelti</i>
<b>Winter Coat</b>	Shorter and lighter in color (straw color) than <i>nelsoni</i> or <i>roosevelti</i> .	Intermediate color	Darkest color
<b>Skull Dimensions</b>	Smallest, shortest, broadest of the species.	Intermediate	Although skulls are similar, <i>roosevelti</i> skulls tend to be larger and more slender than <i>nelsoni</i> skulls.
<b>Tooth Row</b>	Largest	Next largest	Shortest
<b>Other Skull Measurements</b>	Lesser/greater degree	Intermediate	Greater/lesser degree

## Average and Maximum Weights of Tule Elk, Rocky Mountain Elk, and Roosevelt Elk\*

	Average Weight (in pounds)			Maximum Weight (in pounds)		
	Tule Elk ( <i>Cervus canadensis nannodes</i> )	Rocky Mountain Elk ( <i>Cervus canadensis nelsoni</i> )	Roosevelt Elk ( <i>Cervus canadensis roosevelti</i> )	Tule Elk ( <i>Cervus canadensis nannodes</i> )	Rocky Mountain Elk ( <i>Cervus canadensis nelsoni</i> )	Roosevelt Elk ( <i>Cervus canadensis roosevelti</i> )
<b>Bull</b>	<b>~500</b> (427, 554)	<b>600-700</b> (631, 730)	<b>~800?</b> (560, 700-1000)	<b>~700</b> (680, 700)	<b>~1000</b> (1032)	<b>~1100?</b> (1000-1200)
<b>Cow</b>	<b>~400</b> (411)	<b>~550</b> (520, 562)	(459)	n/a	n/a	n/a

Numbers in parentheses are actual weights.

\*Statistics for actual weights from *Tule Elk: Its History, Behavior, and Ecology* by Dale McCullough (1969)



### **General Tule Elk Facts**

- “Bulls,” “Cows,” “Calves”
- Sexual dimorphism
  - Bulls: 500 lbs., dark mane, antlers
  - Cows: 400 lbs., darker coat
- Growth
  - Bulls grow continuously throughout life
  - Cows stop growing at adult size
- Sexual maturity at 1 yr. old for both sexes
- Bulls and cows aggregate separately during non-rut
- Lifespan 12 – 21 years
- Graze primarily on grasses and some forbs and shrubs
- Predators
  - Grizzly bears and coyotes throughout elk range
  - Black bears in north coast range
  - Mountain lions north/south of Bay Area

### **Daily Activities**

- Alternating periods of rest (bedded) and feeding
- While bedded down, elk often ruminate
- Each period lasts for about 2 hours around the clock
- Occasionally found asleep with head held erect
- Frequent disturbances can alter the pattern

### **Herd Behavior**

- Herd behavior is related to need for protection against predators in open country
- Handicapped animals are often culled from the herd
- Normal herd speed = 22-24 mph
- Full speed = 28 mph

### **Social Structure**

- Social structure is based on hierarchies
  - Hierarchy among adults
  - Separate hierarchy among calves
  - Hierarchies help maintain spacing of individuals within the herd

### **Bull Hierarchy**

- Based on body size and antler development
- “Antler threat”
  - Snapping head down to display antlers, ears layed back
  - Display toward subordinate bulls
- Sparring, mock sparring
  - Bull slowly lowers head and twists from side to side
  - Pushing to test strength
  - Display towards bulls of equal rank



Sparring

### **Cow Hierarchy**

- “Charge”
  - Head and neck extended, ears depressed, teeth grinding, display of upper canines
  - May be followed by rearing and boxing
- “Submission”
  - Dominant cow places muzzle on flank of subordinate and stamps foreleg
- Direct look important



Boxing

## Tule Elk Hierarchy

Adult bulls



Adult cows



1 and 2 yr. old bulls



Yearling cows

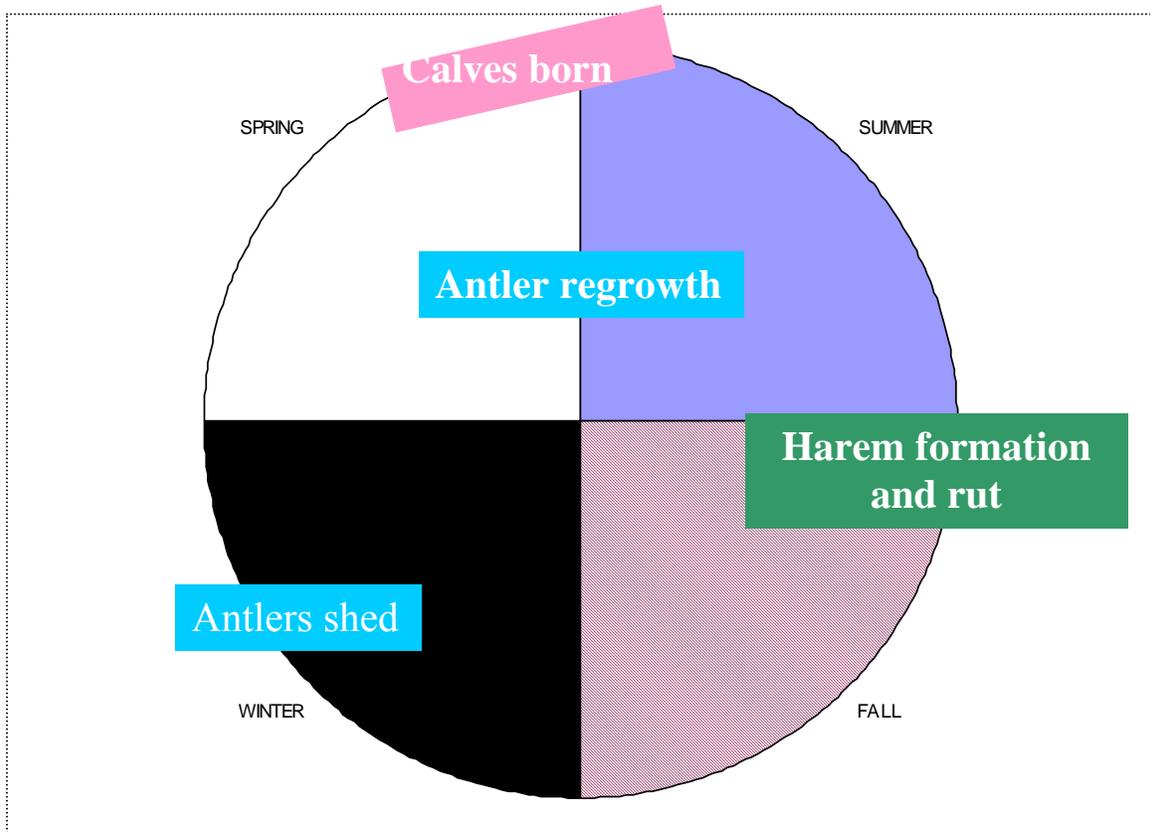
Calves have separate hierarchy from others

## Leadership

- Not a static position
- Involves an animal that takes initiative and second group of animals willing to follow
- In large cow groups, several cows may assume leadership
- Nothing rigid about following

## Annual Cycle

- Photoperiod sets the cycle
- Nutrition affects the timing and rate of the cycle



### **Antler Development with Age**

- 1 year old – spike antlers averaging 10”, +/-10”
- 2 year old – 25-30”, 4 of 5 small points, lightly constructed
- 3 year old – 5 point, heavier, stronger
- 4 year old – 6 point
  
- Antler size increases with age
- Extra terminal points and terminal palmation in older bulls
- Number of points does not indicate age

### **Antler Casting**

- Typically around February/March
- Largest bulls cast 1st, smaller bulls later, yearlings last
- Decreasing testosterone initiates casting

### **Antler Regrowth**

- New growth apparent 1 month after casting
- Oldest bulls begin regrowth earliest, the youngest last
- Growing antlers in velvet
- Antlers carried carefully to avoid damage

### **Maturation of Antlers**

- Rise in testosterone initiates mineralization
- Mineralization proceeds from base to tips
- Velvet sheds for 4-5 days
  - Progresses from tips to base
  - Thrash vegetation to remove velvet
- Newly exposed antler is white
- Staining of antlers, as well as teeth, a result of plant chemicals

### **Molting**

- Occurs in the spring
- Older animals molt first, youngest last
- Color is darker after the spring molt, fades to light color in winter
- Cows generally darker than bulls

### **Rut – Bull Advertising Acts**

- Bugle
  - Throaty roar heard up to 70 yards
  - Whistle followed by series of grunts
- Thrash/urinate



Bugle



Self-urination

### **Rut – Bull/Bull Interactions**

- Dominant bull drives other bulls away from cow herds to form harems
- Yearling bulls last to be driven out, if at all
- Dominant bull charges other bulls, may engage in sparring

### **Rut – Bull/Cow Interactions**

- Herding
- Sexual approaches
  - Approach from rear
  - Premount
  - Smell females as they are bedded

## Rut – Copulation

- Cows must be receptive and willing for breeding to occur
- Cows in estrus for about 12 hours at a time
- If not fertilized, will return in estrus after 21 days
- Bulls grimace, or exhibits flehmen response to detect cows in estrus



Flehmen

- Bulls initiate mating, cows passive
- Bull walks up to cow from behind, places chin on rump
- Mounts cow for a few seconds



Copulation

### So you want to be a bull with a harem?

- The bull spends most of his time:
  - Herding the harem
  - Defending his status from challengers
  - Chasing off bulls looking for opportunities to mate
  - Sniffing cows to find the one in estrus at that time
- The bull spends less time
  - Grazing
  - Resting
- Bulls dominant at the start of the rut may fall out of dominance from fatigue as the rut progresses

### Reproduction

- Gestation about 8 mos.
- Cows gives birth to single calf in an area away from the herd beginning around March
- Sex ratio 1:1
- Calves
  - Born at 20-25 lbs.
  - Spotted
  - Have slight scent
  - Able to walk

### Calves

- Calves bed down and hide, remaining motionless
- Cows feed nearby
- Exchange calls to locate each other
- Nursing initiated by cow; nurses calf for up to 2 minutes
- Calves begin grazing several days after birth
- Weaned in the fall
- Calves develop relatively rapidly
  - Grow about 1#/day
  - At 2 weeks old, calf can keep up with most movements of the herd
  - At 3 weeks old, cow brings calf into herd
- Calves vulnerable to predation until they are brought into the herd



Calf



Nursing