1. Feet have even number of well-developed digits (except *Tayassu*. which has 3 toes on hind feet). Main axis of foot passes through 3rd and 4th digits, others are reduced or lost. (paraxonic)

2. The 3 modern Suborders differ in their types of stomachs, teeth, and the extent that the metatarsals or metacarpals are fused into a cannon bone:

**Suiformes** (pig-like forms) have non-ruminating stomachs, bunodont teeth, and the metatarsals and metacarpals are not fused.

**Tylopoda** (camelids) have a 3-chambered ruminating stomach, selenodont teeth, and the metatarsals and metacarpals fused for most of their length, but not the distal ends (near feet).

**Ruminantia** (deer, antelopes, giraffes, other bovids, etc.) have a 4-chambered ruminating stomach, selenodont teeth, and fused metatarsals and metacarpals. All families except Tragulidae and Moschidae have some form of horns or antlers.
Family Suidae (pigs, hogs: 5 genera, 19 species)

- Native to Eurasia and Africa, but widely introduced
- Thick, sparsely haired skin
- Long, narrow, sloping skull
- Large, ever-growing canines form tusks that curve upward
- Molars bunodont
- Eat broad range of plant material, carrion, will also kill and eat small animals
- Mostly forested and brushy habitats, warthogs in savannas
Phacochoerus africanus

Babyrousia babyrussa
Family Tayassuidae (peccaries: 3 genera, 3 species)

- Southwestern US through Argentina
- Smaller than most suids: about 30 kg (suids can get up to about 200 kg, although some species are small)
- Canines tusk-like, but directed outward, not upward; upper slide against lower making sharp edges
- Less carnivorous than suids, molars bunodont and squarish
- Deserts to tropical forests

Tayassu pecari
Pecari tajacu
Family Hippopotamidae (hippos: 2 genera, 2 species)

- Africa south of Sahara; pygmy hippo only in western Africa

- *Hippopotamus* up to 3600 kg, *Hexaprotodon* only about 180 kg

- Amphibious, restricted to areas near water but comes on shore at night to graze

- Skin glands exude reddish, oily substance; mostly hairless except bristles on snout

- Bunodont molars, tusk-like canines

- Common hippo gregarious, pygmy hippo solitary or in pairs
Family Camelidae (camels, llamas: 3 genera, 4 species)

• *Camelus* in Africa and Asia, *Lama* and *Vicugna* in S. Am.

• metacarpals and metatarsals only partly fused, distal end of foot split; broader foot for support in soft sand

• selenodont, incisors and canines present

• herbivorous, grazers; gregarious, diurnal

• run with odd stride, both legs on same side of body swing together

• camels up to 700 kg, guanaco about 140 kg, vicuna only 55 kg
Lama guanicoe

Vicugna vicugna
Family Tragulidae (chevrotains, mouse deer: 3 genera, 8 species)

- central Africa and SE Asia
- tropical forests
- small, delicate (2.5 – 4.6 kg)
- most similar in body form to ancestral ruminants
- upper canines tusk-like (esp. males), cheek teeth selenodont
- no antlers or horns
- secretive, solitary
- 3-chambered stomach
Family Moschidae (musk deer: 1 genus, 7 species)

*Moschus moschiferus*

• Siberia and Himalayas, northern parts of SE Asia
• no antlers, tusk-like upper canines (mostly in males)
• smallish, about 18 kg
• musk gland in abdomen of males, used in perfume industry
• all species endangered, now mostly in captivity
Family Cervidae (deer types: 3 subfamilies, 19 genera, 51 species)

- most of N. and S. America, Europe, Asia, NW Africa (but not south of Sahara), widely introduced
- appeared in Miocene in Asia, migrated to N. Am. by late Miocene, then to S. Am. in Pleistocene
- males of most species have antlers, females also may have antlers in *Rangifer* (caribou or reindeer)
- 4 species only have single spikes instead of full racks (*Mazama, Elaphodus, Pudu, Muntiacus*); Chinese water deer (*Hydropotes*) have no antlers, but tusks like musk deer
- range of sizes from about 8 kg (*Pudu*) to 800 kg (*Alces*)
- selenodont cheek teeth
some Cervids

*Hydropotes inermis* – Chinese water deer

*Pudu pudu* - South America

*Mazama americana* – South America, red brocket deer
more Cervids
(the 3 you need to know)

Alces alces

Cervus elaphus

Odocoileus virginianus
and just a few more Cervids

Elaphurus davidianus – Pere David’s deer

Rangifer tarandus

Axis axis – originally from southern Asia, but widely introduced in Europe and S. Am.
Family *Giraffidae* (giraffe and okapi: 2 genera, 2 species)

- *Giraffa* in Africa south of the Sahara, *Okapia* in Congo region

- giraffe: savannas, moderately wooded areas, semi-deserts; okapi in dense forest; both browsers

- giraffe is large (about 1800 kg, about 5.5 at head)

- “horns” comprised of distinct bone, fused to frontals but not growing out of them, covered by skin; present in both sexes

- giraffes may form groups, okapis are solitary; male giraffes fight by swinging their heads
Just for scale...
Family Antilocapridae (pronghorn: 1 genus, 1 species)

- western North America
- open grassland and semi-desert
- highly cursorial; next fastest sprinter after cheetah, but with greater endurance
- unique horns: keratin sheath is shed each year as new sheath grows underneath it; females may have horns, but if so they are smaller than those of males
- selenodont cheek teeth; both graze and browse, but especially on sagebrush
Family Bovidae (all the remaining ungulates! antelopes, cattle, sheep, goats, etc.: 8 subfamilies, 50 genera, 143 species)

• most widespread and diverse family of ungulates

• native to Africa, Europe, Asia, North America...introduced to South America and Australia

• hypsodont and selenodont cheek teeth, with no upper incisors or canines

• 4-chambered, ruminating stomachs

• all species have paired horns on males and usually on females (1 species of antelope has 4 horns: *Tetracerus*); horns grow throughout life, can have a variety of shapes

• smallest antelopes about 2.5 kg, to large bison, cattle, and elands around 1000 kg
some Bovids

*Bison bison* – N Am bison

*Bison bonasus* – European wood bison

*Ovis canadensis* – bighorn sheep
How lame is that? We have hardly any bovid specimens for you to learn, not even the other important North American ones! Here are 2 more North American bovids you should be familiar with...

- *Oreamnos americanus* – mountain goats
- *Ovibos moschatus* – muskoxen

Of course, Bovids reach their greatest diversity in Africa and Asia.
some “cattle-type” and other large Bovids

Syncerus caffer

Bubalus bubalis

Connochaetes taurinus

Taurotragus oryx
a few goat and sheep types...

Hemitragus jemlahicus

Capra ibex

Ovis dalli

Rupicapra rupicapra
lots of antelope types....

Madoqua guentheri

Aepyceros melampus

Dorcatragus megalotis

Saiga borealis

Oryx gazella

Hippotragus niger