

= Bovidae =

Bovidae is the biological family of cloven @-@ hooved , ruminant mammals that includes bison , African buffalo , water buffalo , antelopes , gazelles , sheep , goats , muskoxen , and domestic cattle . A member of this family is called a bovid . Consisting of 143 extant species and 300 known extinct species , the family Bovidae consists of eight major subfamilies apart from the disputed Peleinae and Pantholopinae . The family evolved 20 million years ago , in the early Miocene .

The bovids show great variation in size and pelage colouration . Excepting some domesticated forms , all male bovids have two or more horns , and in many species females possess horns , too . The size and shape of the horns vary greatly , but the basic structure is always one or more pairs of simple bony protrusions without branches , often having a spiral , twisted or fluted form , each covered in a permanent sheath of keratin . Most bovids bear 30 to 32 teeth .

Most bovids are diurnal . Social activity and feeding usually peak during dawn and dusk . Bovids typically rest before dawn , during midday , and after dark . They have various methods of social organisation and social behaviour , which are classified into solitary and gregarious behaviour . Bovids use different forms of vocal , olfactory , and tangible communication . Most species alternately feed and ruminate throughout the day . While small bovids forage in dense and closed habitat , larger species feed on high @-@ fiber vegetation in open grasslands . Most bovids are polygynous . Mature bovids mate at least once a year and smaller species may even mate twice . In some species , neonate bovids remain hidden for a week to two months , regularly nursed by their mothers ; in other species , neonates are followers , accompanying their dams , rather than tending to remain hidden .

The greatest diversities of bovids occur in Africa . The maximum concentration of species is in the savannas of eastern Africa . Other bovid species also occur in Europe , Asia , and North America . Bovidae includes three of the five domesticated mammals whose use has spread outside their original ranges , namely cattle , sheep , and goats . Dairy products such as milk , butter , and cheese are manufactured largely from domestic cattle . Bovids also provide leather , meat , and wool .

= = Etymology = =

The name " Bovidae " was given by the British zoologist John Edward Gray in 1821 . The word " Bovidae " is the combination of the prefix bov- (originating from Latin bos , " ox " , through Late Latin bovinus) and the suffix -idae .

= = Taxonomy = =

The family Bovidae is placed in the order Artiodactyla (which includes the even @-@ toed ungulates) . It includes 143 extant species , accounting for nearly 55 % of the ungulates , and 300 known extinct species .

Molecular studies have supported monophyly in the family Bovidae (a monophyletic group of organisms comprises an ancestral species and their descendants) . The number of subfamilies in Bovidae is disputed , with suggestions of as many as ten and as few as two subfamilies . However , molecular , morphological and fossil evidence indicates the existence of eight distinct subfamilies : Aepycerotinae (consisting of just the impala) , Alcelaphinae (bontebok , hartebeest , wildebeest and relatives) , Antilopinae (several antelopes , gazelles , and relatives) , Bovinae (cattle , buffaloes , bison and other antelopes) , Caprinae (goats , sheep , ibex , serows and relatives) , Cephalophinae (duikers) , Hippotraginae (addax , oryx and relatives) and Reduncinae (reedbuck and kob antelopes) . In addition , three extinct subfamilies are known : Hypsodontinae (mid @-@ Miocene) , Oiocerinae (Turolian) and the subfamily Tethytraginae , which contains Tethytragus (mid @-@ Miocene) .

In 1992 , Alan W. Gentry of the Natural History Museum , London divided the eight major subfamilies of Bovidae into two major clades on the basis of their evolutionary history : the

Boodontia , which comprised only the Bovinae , and the Aegodontia , which consisted of the rest of the subfamilies . Boodonts have somewhat primitive teeth , resembling those of oxen , whereas aegodonts have more advanced teeth like those of goats .

A controversy exists about the recognition of Peleinae and Patholopinae , comprising the genera Pelea and Pantholops respectively , as subfamilies . In 2000 , American biologist George Schaller and palaeontologist Elisabeth Vrba suggested the inclusion of Pelea in Reduncinae , though the grey rhebok , the sole species of Pelea , is highly different from kobs and reduncines in morphology . Pantholops , earlier classified in the Antilopinae , was later placed in its own subfamily , Pantholopinae . However , molecular and morphological analysis supports the inclusion of Pantholops in Caprinae .

Below is a cladogram based on Gatesy et al . (1997) and Gentry et al . (1997)

= = Evolution = =

= = = Early Miocene and before = = =

In the early Miocene , bovids began diverging from the cervids (deer) and giraffids . The earliest bovids , whose presence in Africa and Eurasia in the latter part of early Miocene (20 Mya) has been ascertained , were small animals , somewhat similar to modern gazelles , and probably lived in woodland environments . Eotragus , the earliest known bovid , weighed 18 kg (40 lb) and was nearly the same in size as the Thompson 's gazelle . Early in their evolutionary history , the bovids split into two main clades : Boodontia (of Eurasian origin) and Aegodontia (of African origin) . This early split between Boodontia and Aegodontia has been attributed to the continental divide between these land masses . When these continents were later rejoined , this barrier was removed , and either group expanded into the territory of the other . The tribes Bovini and Tragelaphini diverged in the early Miocene . Bovid are known to have reached the Americas in the Pleistocene by crossing the Bering land bridge .

The present genera of Alcelaphinae appeared in the Pliocene . The extinct Alcelaphine genus Paramularius , that was the same in size as the hartebeest , is believed to have come into being in the Pliocene , but became extinct in the middle Pleistocene . Several genera of Hippotraginae are known since the Pliocene and Pleistocene . This subfamily appears to have diverged from the Alcelaphinae in the latter part of early Miocene . The Bovinae are believed to have diverged from the rest of the Bovidae in the late Oligocene . The Boselaphini became extinct in Africa in the early Pliocene ; their latest fossils were excavated in Langebaanweg (South Africa) and Lothagam (Kenya) .

= = = Middle Miocene = = =

The middle Miocene marked the spread of the bovids into China and the Indian subcontinent . According to Vrba , the radiation of the subfamily Alcelaphinae began in the latter part of middle Miocene . The Caprinae tribes probably diverged in the early middle Miocene . The Caprini emerged in the middle Miocene , and seem to have been replaced by other bovids and cervids in Eurasia . The earliest fossils of the antilopines are from the middle Miocene , though studies show the existence of the subfamily from the early Miocene . Speciation occurred in the tribe Antilopini during the middle or upper Miocene , mainly in Eurasia . Tribe Neotragini seems to have appeared in Africa by the end of Miocene , and had become widespread by the Pliocene .

= = = Late Miocene = = =

By the late Miocene , around 10 Mya , the bovids rapidly diversified , leading to the creation of 70 new genera . This late Miocene radiation was partly because many bovids became adapted to more open , grassland habitats . The Aepycerotinae first appeared in the late Miocene , and no significant

difference in the sizes of the primitive and modern impala has been noted . Fossils of bovidines , a tribe of Caprinae , in Africa date back to the late Miocene . The earliest Hippotragine fossils date back to the late Miocene , and were excavated from sites such as Lothagam and Awash Valley . The first African fossils of Reduncinae date back to 6 @-@ 7 Mya . Reduncinae and Peleinae probably diverged in the mid @-@ Miocene .

= = Characteristics = =

All bovids have the similar basic form - a snout with a blunt end , one or more pairs of horns (generally present on males) immediately after the oval or pointed ears , a distinct neck and limbs , and a tail varying in length and bushiness among the species . Most bovids exhibit sexual dimorphism , with males usually larger as well as heavier than females . Sexual dimorphism is more prominent in medium- to large @-@ sized bovids . All bovids have four toes on each foot ? they walk on the central two (the hooves) , while the outer two (the dewclaws) are much smaller and rarely touch the ground .

The bovids show great variation in size : the gaur can weigh as much as 1 @, @ 000 kg (2 @, @ 200 lb) and stands 2 ? 3 m (6 @. @ 6 ? 9 @. @ 8 ft) high at the shoulder . The water buffalo can be even heavier , and weigh 1 @, @ 200 kg (2 @, @ 600 lb) , though it is shorter than the gaur , being at most 2 m (6 @. @ 6 ft) tall . The royal antelope , in sharp contrast , is only 25 cm (9 @. @ 8 in) tall and weighs at most 3 kg (6 @. @ 6 lb) . The klipspringer , another small antelope , stands 45 ? 60 cm (18 ? 24 in) at the shoulder and weighs just 10 ? 20 kg (22 ? 44 lb) .

Differences occur in pelage colouration , ranging from a pale white (as in the Arabian oryx) to black (as in the black wildebeest) . However , only the intermediate shades , such as brown and reddish brown (as in the reedbuck) , are commonly observed . In several species , females and juveniles exhibit a light @-@ coloured coat , while those of males darken with age . As in the wildebeest , the coat may be marked with prominent or faint stripes . In some species such as the addax , the coat colour can vary by the season . Scent glands and sebaceous glands are often present .

Some species , such as the gemsbok , sable antelope , and Grant 's gazelle , are camouflaged with strongly disruptive facial markings that conceal the highly recognisable eye . Many species , such as gazelles , may be made to look flat , and hence to blend into the background , by countershading . The outlines of many bovids are broken up with bold disruptive colouration , the strongly contrasting patterns helping to delay recognition by predators . However , all the Hippotraginae (including the gemsbok) have pale bodies and faces with conspicuous markings . The zoologist Tim Caro describes this as difficult to explain , but given that the species are diurnal , he suggests that the markings may function in communication . Strongly contrasting leg colouration is common only in the Bovidae , where for example Bos , Ovis , bontebok and gemsbok have white stockings . Again , communication is the likely function .

Excepting some domesticated forms , all male bovids have horns , and in many species , females , too , possess horns . The size and shape of the horns vary greatly , but the basic structure is a pair of simple bony protrusions without branches , often having a spiral , twisted , or fluted form , each covered in a permanent sheath of keratin . Although horns occur in a single pair on almost all bovid species , there are exceptions such as the four @-@ horned antelope and the Jacob sheep . The unique horn structure is the only unambiguous morphological feature of bovids that distinguishes them from other pecorans . A high correlation exists between horn morphology and fighting behaviour of the individual . For instance , long horns are intended for wrestling and fencing , whereas curved horns are used in ramming . Males with horns directed inwards are monogamous and solitary , while those with horns directed outwards tend to be polygynous . These results were independent of body size .

Male horn development has been linked to sexual selection , Horns are small spikes in the monogamous duikers and other small antelopes , whereas in the polygynous , they are large and elaborately formed (for example in a spiral structure , as in the giant eland) . Thus , to some extent , horns depict the degree of competition among males in a species . However , the presence of

horns in females is likely due to natural selection . The horns of females are usually smaller than those of males , and are sometimes of a different shape . The horns of female bovids are believed to have evolved for defence against predators or to express territoriality , as nonterritorial females , which are able to use crypsis for predator defence , often do not have horns . Females possess horns only in half of the bovid genera , and females in these genera are heavier than those in the rest . Females use horns mainly for stabbing .

=== Anatomy ===

In bovids , the third and fourth metapodials are combined into the cannon bone . The ulna and fibula are reduced , and fused with the radius and tibia , respectively . Long scapulae are present , whereas the clavicles are absent . Being ruminants , the stomach is composed of four chambers : the rumen (80 %) , the omasum , the reticulum , and the abomasum . The ciliates and bacteria of the rumen ferment the complex cellulose into simpler fatty acids , which are then absorbed through the rumen wall . Bovid s have a long small intestine ; the length of the small intestine in cattle is 29 ? 49 m (95 ? 161 ft) . Body temperature fluctuates through the day ; for instance , in goats the temperature can change slightly from nearly 37 ° C (99 ° F) in the early morning to 40 ° C (104 ° F) in the afternoon . Temperature is regulated through sweating in cattle , whereas goats use panting for the same . The right lung , consisting of four to five lobes , is around 1 @. @ 5 times larger than the left , which has three lobes .

=== Dentition ===

Most bovids bear 30 to 32 teeth . While the upper incisors are absent , the upper canines are either reduced or absent . Instead of the upper incisors , bovids have a thick and tough layer of tissue , called the dental pad , that provides a surface to grip grasses and foliage . They are hypsodont and selenodont , since the molars and premolars are low @-@ crowned and crescent @-@ shaped cusps . The lower incisors and canines project forward . The incisors are followed by a long toothless gap , known as the diastema . The general dental formula for bovids is 0 @. @ 0 @. @ 2 @-@ 3 @. @ 33 @. @ 1 @. @ 3 @. @ 3 . Most members of the family are herbivorous , but most duikers are omnivorous . Like other ruminants , bovids have four @-@ chambered stomachs , which allow them to digest plant material , such as grass , that cannot be used by many other animals . Ruminants (and some others like kangaroos , rabbits , and termites) are able to use micro @-@ organisms living in their guts to break down cellulose by fermentation .

=== Ecology and behaviour ===

The bovids have various methods of social organisation and social behaviour , which are classified into solitary and gregarious behaviour . Further , these types may each be divided into territorial and nonterritorial behaviour . Small bovids such as the klipspringer , oribi , and steenbok are generally solitary and territorial . They hold small territories into which other members of the species are not allowed to enter . These antelopes form monogamous pairs . Many species such as the dik @-@ dik use pheromone secretions from the preorbital glands and sometimes dung , as well , to mark their territories . The offspring disperse at the time of adolescence , and males need must acquire territories prior to mating . The bushbuck is the only bovid that is both solitary and not territorial . This antelope hardly displays aggression , and tends to isolate itself or form loose herds , though in a favourable habitat , several bushbuck may be found quite close to one another .

Excluding the cephalophines (duikers) , tragelaphines (spiral @-@ horned antelopes) and the neotragines , most African bovids are gregarious and territorial . Males are forced to disperse on attaining sexual maturity , and must form their own territories , while females are not required to do so . Males that do not hold territories form bachelor herds . Competition takes place among males to acquire dominance , and fights tend to be more rigorous in limited rutting seasons . With the exception of migratory males , males generally hold the same territory throughout their lives . In the

waterbuck , some male individuals , known as " satellite males " , may be allowed into the territories of other males and have to wait till the owner grows old so they may acquire his territory . Lek mating , where males gather together and competitively display to potential mates , is known to exist among topis , kobs , and lechwes . The tragelaphines , cattle , sheep , and goats are gregarious and not territorial . In these species , males must gain absolute dominance over all other males , and fights are not confined to territories . Males , therefore , spend years in body growth .

= = = Activity = = =

Most bovids are diurnal , although a few such as the buffalo , bushbuck , reedbuck , and grysbok are exceptions . Social activity and feeding usually peak during dawn and dusk . The bovids usually rest before dawn , during midday , and after dark . Grooming is usually by licking with the tongue . Rarely do antelopes roll in mud or dust . Wildebeest and buffalo usually wallow in mud , whereas the hartebeest and topi rub their heads and horns in mud and then smear it over their bodies . Bovid use different forms of vocal , olfactory , and tangible communication . These involve varied postures of neck , head , horns , hair , legs , and ears to convey sexual excitement , emotional state , or alarm . One such expression is the flehmen response . Bovid usually stand motionless , with the head high and an intent stare , when they sense danger . Some like the impala , kudu , and eland can even leap to heights of a few feet . Bovid may roar or grunt to caution others and warn off predators , which include lion , tiger , brown bear , crocodile , dhole , Komodo dragon , spotted hyena , and cougar . Bovid such as gazelles stot or prong in response to predators , making high leaps on stiff legs , indicating honestly both that the predator has been seen , and that the stotting individual is strong and not worth chasing .

In the mating season , rutting males bellow to make their presence known to females . Muskoxen roar during male @-@ male fights , and male saigas force air through their noses , producing a roar to deter rival males and attract females . Mothers also use vocal communication to locate their calves if they get separated . During fights over dominance , males tend to display themselves in an erect posture with a level muzzle .

Fighting techniques differ amongst the bovid families and also depend on their build . While the hartebeest fight on knees , others usually fight on all fours . Gazelles of various sizes use different methods of combat . Gazelles usually box , and in serious fights may clash and fence , consisting of hard blows from short range . Ibex , goat and sheep males stand upright and clash into each other downwards . Wildebeest use powerful head butting in aggressive clashes . If horns become entangled , the opponents move in a circular manner to unlock them . Muskoxen will ram into each other at high speeds . As a rule , only two bovids of equal build and level of defence engage in a fight , which is intended to determine the superior of the two . Individuals that are evidently inferior to others would rather flee than fight ; for example , immature males do not fight with the mature bulls . Generally , bovids direct their attacks on the opponent 's head rather than its body . The S @-@ shaped horns , such as those on the impala , have various sections that help in ramming , holding , and stabbing . Serious fights leading to injury are rare .

= = = Diet = = =

Most bovids alternately feed and ruminate throughout the day . While those that feed on concentrates feed and digest in short intervals , the roughage feeders take longer intervals . Only small species such as the duiker browse for a few hours during day or night . Feeding habits are related to body size ; while small bovids forage in dense and closed habitat , larger species feed upon high @-@ fiber vegetation in open grasslands . Subfamilies exhibit different feeding strategies . While Bovinae species graze extensively on fresh grass and diffused forage , Cephalophinae species (with the exception of Sylvicapra) primarily consume fruits . Reduncinae and Hippotraginae species depend on unstable food sources , but the latter are specially adapted to arid areas . Members of Caprinae , being flexible feeders , forage even in areas with low productivity . Tribes Alcelaphini , Hippotragini , and Reduncini have high proportions of monocots in their diets . On the

contrary , Tragelaphini and Neotragini (with the exception of Ourebia) feed extensively on dicots . No conspicuous relationship exists between body size and consumption of monocots .

= = = Sexuality and reproduction = = =

Most bovids are polygynous . In a few species , individuals are monogamous , resulting in minimal male @-@ male aggression and reduced selection for large body size in males . Thus , sexual dimorphism is almost absent . Females may be slightly larger than males , possibly due to competition among females for the acquisition of territories . This is the case in duikers and other small bovids . The time taken for the attainment of sexual maturity by either sex varies broadly among bovids . Sexual maturity may even precede or follow mating . For instance the impala males , though sexually mature by a year , can mate only after four years of age . On the contrary barbary sheep females may give birth to offspring even before they have gained sexual maturity . The delay in male sexual maturation is more visible in sexually dimorphic species , particularly the reedbucks , probably due to competition among males . For instance , the blue wildebeest females become capable of reproduction within a year or two of birth , while the males become mature only when four years old .

All bovids mate at least once a year , and smaller species may even mate twice . Mating seasons occur typically during the rainy months for most bovids . As such , breeding might peak twice in the equatorial regions . The sheep and goats exhibit remarkable seasonality of reproduction , in the determination of which the annual cycle of daily photoperiod plays a pivotal role . Other factors that have a significant influence on this cycle include the temperature of the surroundings , nutritional status , social interactions , the date of parturition and the lactation period . A study of this phenomenon concluded that goats and sheep are short @-@ day breeders . Mating in most sheep breeds begins in summer or early autumn . Mating in sheep is also affected by melatonin , that advances the onset of the breeding season ; and thyroxine , that terminates the breeding season . Estrus lasts for at most a day in bovids , with the exception of bovines and tragelaphines . Except the hartebeest and the topi , all bovids can detect estrus in females by testing the urine using the vomeronasal organ . Once the male is assured that the female is in estrus , he begins courtship displays ; these displays vary greatly from the elaborate marches among gregarious species to the fervent licking of female genitalia among solitary species . Females , initially not receptive , ultimately mates with the male which has achieved dominance over others . Receptiveness is expressed by permission for mounting by the male and setting aside the tail by the female . Copulation generally takes a few seconds .

Gestational period varies among bovids - while duiker gestation ranges from 120 to 150 days , gestation in African buffalo ranges from 300 to 330 days . Usually , a single offspring is born (twins are less frequent) , and it is able to stand and run by itself within an hour of birth . In monogamous species , males assist in defending their young , but that is not the case in polygynous species . Most newborn calves remain hidden for a week to two months , regularly nursed by their mothers . In some bovid species the neonates start following about their mothers immediately or within a few days , as in the impala . Different bovids have different strategies for defence of juveniles . For instance , while wildebeest mothers solely defend their young , buffaloes exhibit collective defence . Weaning might occur as early as two months (as in royal antelope) or as late as a year (as in muskox) .

= = = Lifespan = = =

Most wild bovids live for 10 to 15 years . Larger species tend to live longer ; for instance , American bison can live up to 25 years and gaur up to 30 years . The mean lifespan of domesticated individuals is nearly ten years . For example , domesticated goats have an average lifespan of 12 years . Most wild bovids live between 10 and 15 years , with larger species tending to live longer . Usually males , mainly in polygynous species , have shorter lifespans than females . This can be attributed to several reasons : early dispersal of young males , aggressive male @-@ male fights ,

vulnerability to predation (particularly when males are less agile , as in kudu) , and malnutrition (being large in size , the male body has high nutritional requirements which may not be satisfied) . Richard Despard Estes suggested that females mimic male secondary sexual characteristics like horns to protect their male offspring from dominant males . This feature seems to have been strongly selected to prevent male mortality and imbalanced sex ratios due to attacks by aggressive males and forced dispersal of young males during adolescence .

= = Distribution = =

Most of the diverse bovid species occur in Africa . The maximum concentration is in the savannas of eastern Africa . Depending on their feeding habits , several species have radiated over large stretches of land , and hence several variations in dental and limb morphology are observed . Duikers inhabit the equatorial rainforests , sitatunga , and lechwe occur near swamps , eland inhabit grasslands , springbok and oryx occur in deserts , bongo and anoa live in dense forests , and mountain goats and takin live at high altitudes . A few bovid species also occur in Europe , Asia , and North America . Only two tribes of Bovidae - Antilopini and Hippotragini - are found outside the African continent . Sheep and goats are found primarily in Eurasia , though the Barbary sheep and the ibex form part of the African fauna . The muskox is confined to the arctic tundra . Several bovid species have been domesticated by human beings . The domestication of goats and sheep began 10 thousand years ago , while cattle were domesticated about 7 @.@ 5 thousand years ago .

= = Interaction with humans = =

= = = Domesticated animals = = =

The domestication of bovids has contributed in shifting the dependence of human beings from hunting and gathering to agriculture . The Bovidae include three of the five domesticated mammals whose use has spread outside their original ranges , namely cattle , sheep , and goats ; all are from Eurasia , and are now found across the world . The other two species are the horse and pig . Other large bovids that have been domesticated but which remain within the ranges of their wild ancestors are the domestic buffalo (from the Indian water buffalo) , yak , zebu (from the gaur or Indian aurochs) and Bali cattle (from the banteng) .

The earliest evidence of cattle domestication is from 8000 BC , suggesting that the process began in Cyprus and the Euphrates basin .

= = = Animal products = = =

Dairy products such as milk , butter , ghee , yoghurt , buttermilk and cheese are manufactured largely from domestic cattle , though the milk of sheep , goat , yak , and buffalo is also used in some parts of the world and for gourmet products . For example , buffalo milk is used to make mozzarella in Italy and gulab jamun dessert in India , while sheep milk is used to make blue Roquefort cheese in France . Beef is an excellent source of zinc , selenium , phosphorus , iron , and B vitamins . Bison meat is lower in fat and cholesterol than beef , but has a higher protein content .

Bovid leather is tough and durable , with the additional advantage that it can be made into leathers of varying thicknesses - from soft clothing leather to hard shoe leather . While goat and cattle leather have a wide variety of use , sheepskin is suited only for clothing purposes . Wool from Merino hoggets is the finest and most valuable . Merino wool is 3 ? 5 in (7 @.@ 6 ? 12 @.@ 7 cm) long and very soft . Coarse wools , being durable and resistant to pilling , are used for making tough garments and carpets .

Bone meal is an important fertilizer rich in calcium , phosphorus , and nitrogen , effective in removing soil acidity . Bovid horns have been used as drinking vessels since antiquity .

= = = In human culture = = =

Bovidae have featured in stories since at least the time of Aesop 's fables from Ancient Greece around 600 BC . Fables by Aesop include The Crow and the Sheep , The Frog and the Ox , and The Wolf and the Lamb . The mythological creature Chimera , depicted as a lion , with the head of a goat arising from its back , and a tail that might end with a snake 's head , was one of the offspring of Typhon and Echidna and a sibling of such monsters as Cerberus and the Lernaean Hydra . The sheep , synonymous with the goat in Chinese mythology , is the eighth animal of the Chinese zodiac , and a symbol of filial piety .

= = Classification = =

FAMILY BOVIDAE

= = = Subfamily Aepycerotinae = = =

Tribe Aepycerotini

Genus Aepyceros

Impala , *A. melampus*

= = = Subfamily Alcelaphinae = = =

Tribe Alcelaphini

Subtribe Alcelaphina

Genus Alcelaphus

Hartebeest , *A. buselaphus*

Genus Beatragus

Hirala , *B. hunteri*

Genus Connochaetes

Black wildebeest , *C. gnou*

Blue wildebeest , *C. taurinus*

Genus Damalops ?

Genus Damalacra ?

Genus Megalotragus ?

Genus Numidocapra ?

Genus Oreonager ?

Genus Rabaticeras ?

Subtribe Damaliscina

Genus Damaliscus

Topi , *D. korrigum*

Bontebok , *D. pygargus*

Bangweulu tsessebe , *D. superstes*

Common tsessebe , *D. lunatus*

Genus Paramularius ?

Genus Awashia ?

= = = Subfamily Antilopinae = = =

Tribe Antilopini

Genus Ammodorcas

Dibatag *A. clarkei*

Genus Antidorcas

Springbok *A. marsupialis*

Genus Antilope
Blackbuck *A. cervicapra*
Genus Eudorcas
Mongalla gazelle *E. albonotata*
Red gazelle *E. rufina* ?
Red @-@ fronted gazelle *E. rufrifrons*
Thomson 's gazelle *E. thomsoni*
Heuglin 's gazelle *E. tilonura*
Genus Gazella
G. psolea ?
Arabian gazelle *G. arabica* ?
Chinkara or Indian gazelle *G. benettii*
Queen of Sheba 's gazelle *G. bilkis* ?
Dorcas gazelle *G. dorcas*
Mountain gazelle *G. gazella*
Saudi gazelle *G. saudiya* ?
Speke 's gazelle *G. spekei*
Cuvier 's gazelle *G. cuvieri*
Rhim gazelle or slender @-@ horned gazelle *G. leptoceros*
Goitered gazelle *G. subgutturosa*
Genus Litocranius
Gerenuk *L. walleri*
Genus Nanger
Dama gazelle *N. dama*
Grant 's gazelle *N. granti*
Soemmerring 's gazelle *N. soemmerringii*
Genus Procapra
Zeren *P. gutturosa*
Goa *P. picticaudata*
Przewalski 's gazelle *P. przewalskii*
Tribe Saigini
Genus Saiga
Saiga *S. tatarica*
Tribe Neotragini
Genus Dorcatragus
Beira *D. megalotis*
Genus Madoqua
Günther 's dik @-@ dik *M. guntheri*
Kirk 's dik @-@ dik *M. kirkii*
Silver dik @-@ dik *M. piacentinii*
Salt 's dik @-@ dik *M. saltiana*
Genus Neotragus
Bates 's pygmy antelope *N. batesi*
Suni *N. moschatus*
Royal antelope *N. pygmaeus*
Genus Oreotragus
Klipspringer *O. oreotragus*
Genus Ourebia
Oribi *O. ourebi*
Genus Raphicercus
Steenbok *R. campestris*
Cape grysbok *R. melanotis*
Sharpe 's grysbok *R. sharpei*

= = = Subfamily Bovinae = = =

Tribe Boselaphini

Genus Tetracerus

Four @-@ horned antelope , T. quadricornis

Genus Boselaphus

Nilgai or blue bull , B. tragocamelus

Tribe Bovini

Genus Bubalus

Water buffalo , B. bubalis

Wild Asian water buffalo , B. arnee

Lowland anoa , B. depressicornis

Mountain anoa , B. quarlesi

Tamaraw , B. mindorensis

Cebu tamaraw , B. cebuensis ?

Genus Bos

Aurochs , B. primigenius ?

Banteng , B. javanicus

Gaur , B. gaurus

Gayal , B. frontalis

Yak , B. grunniens

B. palaesondaicus ?

Domestic cattle , B. taurus

Domestic zebu , B. indicus

Kouprey , B. sauveli

Genus Pseudoryx

Saola , P. nghetinhensis

Genus Syncerus

African buffalo , S. caffer

Genus Bison

American bison , B. bison

Wisent , B. bonasus

Steppe wisent , B. priscus ?

Ancient bison , B. antiquus ?

Long @-@ horned bison , B. latifrons ?

Genus Pelorovis ?

Giant buffalo , P. antiquus ?

Tribe Strepsicerotini

Genus Tragelaphus

Bongo , T. eurycerus

Greater kudu , T. strepsiceros

Kéwel , T. scriptus

Bushbuck , T. sylvaticus

Lesser kudu , T. imberbis

Mountain nyala , T. buxtoni

Nyala , T. angasii

Sitatunga , T. spekeii

Genus Taurotragus

Common eland , T. oryx

Giant eland , T. derbianus

= = = Subfamily Caprinae = = =

Tribe Ovibovini
 Genus Budorcas
 Takin , *B. taxicolor*
 Genus Ovibos
 Muskox , *O. moschatus*
 Tribe Caprini
 Genus Ammotragus
 Barbary sheep , *A. lervia*
 Genus Arabitragus
 Arabian tahr , *A. jayakari*
 Genus Capra
 West Caucasian tur , *C. caucasica*
 Markhor , *C. falconeri*
 Wild goat , *C. aegagrus*
 Domestic goat , *C. aegagrus hircus*
 Alpine ibex , *C. ibex*
 Nubian ibex , *C. nubiana*
 Spanish ibex , *C. pyrenaica*
 Siberian ibex , *C. sibirica*
 Walia ibex , *C. walie*
 Genus Hemitragus
 Himalayan tahr , *H. jemlahicus*
 Genus Ovis
 Argali , *O. ammon*
 Domestic sheep , *O. aries*
 American bighorn sheep , *O. canadensis*
 Dall or thinhorn sheep , *O. dalli*
 European mouflon , *O. musimon*
 Snow sheep , *O. nivicola*
 Urial , *O. orientalis*
 Genus Nilgiritragus
 Nilgiri tahr , *N. hylocrius*
 Genus Pseudois
 Bharal (Himalayan blue sheep) , *P. nayaur*
 Dwarf blue sheep , *P. schaeferi*
 Tribe Naemorhedini
 Genus Capricornis
 Japanese serow , *C. crispus*
 Sumatran serow , *C. sumatraensis*
 Taiwan serow , *C. swinhoei*
 Chinese serow , *C. milneedwardsii*
 Red serow , *C. rubidus*
 Himalayan serow *C. thar*
 Genus Nemorhaedus
 Red goral , *N. baileyi*
 Chinese goral , *N. griseus*
 Grey goral , *N. goral*
 Long @-@ tailed goral , *N. caudatus*
 Genus Oreamnos
 Mountain goat , *O. americanus*
 Genus Rupicapra
 Pyrenean chamois , *R. pyrenaica*

Chamois , *R. rupicapra*

= = = Subfamily Cephalophinae = = =

Genus *Cephalophus*

Abbott 's duiker , *C. spadix*

Ader 's duiker , *C. adersi*

Bay duiker , *C. dorsalis*

Black duiker , *C. niger*

Black @-@ fronted duiker , *C. nigrifrons*

Brooke 's duiker , *C. brookei*

Harvey 's duiker , *C. harveyi*

Jentink 's duiker , *C. jentinki*

Ogilby 's duiker , *C. ogilbyi*

Peters 's duiker , *C. callipygus*

Red @-@ flanked duiker , *C. rufilatus*

Red forest duiker , *C. natalensis*

Ruwenzori duiker , *C. rubidis*

Weyns 's duiker , *C. weynsi*

White @-@ bellied duiker , *C. leucogaster*

White @-@ legged duiker *C. crusalbum*

Yellow @-@ backed duiker , *C. silvicultor*

Zebra duiker , *C. zebra*

Genus *Philantomba*

Blue duiker , *P. monticola*

Maxwell 's duiker , *P. maxwellii*

Walter 's duiker , *P. walteri*

Genus *Sylvicapra*

Common duiker , *S. grimmia*

= = = Subfamily Hippotraginae = = =

Genus *Hippotragus*

Roan antelope , *H. equinus*

Sable antelope , *H. niger*

Bluebuck , *H. leucophaeus* ?

Genus *Oryx*

East African oryx , *O. beisa*

Scimitar oryx , *O. dammah*

Gemsbok , *O. gazella*

Arabian oryx , *O. leucoryx*

Genus *Addax*

Addax , *A. nasomaculatus*

= = = Subfamily Pantholopinae = = =

Genus *Pantholops* (also classified under *Caprinae*)

Tibetan antelope , *P. hodgsonii*

= = = Subfamily Peleinae = = =

Genus *Pelea* (also classified under *Reduncinae*)

Grey rhebok , *P. capreolus*

= = = Subfamily Reduncinae = = =

Genus Kobus

Upemba lechwe , K. anselli

Waterbuck , K. ellipsiprymnus

Kob , K. kob

Lechwe , K. leche

Nile lechwe , K. megaceros

Puku , K. vardonii

Genus Redunca

Southern reedbuck , R. arundinum

Mountain reedbuck , R. fulvorufula

Bohor reedbuck , R. redunca