

= Impala =

The impala (pronounced / ˈmʌpˈæl / , -ˈpæl /) (*Aepyceros melampus*) is a medium @-@ sized antelope in eastern and southern Africa . The sole member of the genus *Aepyceros* , it was first described by German zoologist Martin Hinrich Carl Lichtenstein in 1812 . Two subspecies are recognised ? the common impala , and the larger and darker black @-@ faced impala . The impala reaches 70 ? 92 centimetres (28 ? 36 inches) at the shoulder and weighs 40 ? 76 kilograms (88 ? 168 pounds) . It features a glossy , reddish brown coat . The male 's slender , lyre @-@ shaped horns are 45 ? 92 centimetres (18 ? 36 in) long .

Active mainly during the day , the impala may be gregarious or territorial depending upon the climate and geography . Three distinct social groups can be observed ? the territorial males , bachelor herds and female herds . The impala is known for two characteristic leaps that constitute an anti @-@ predator strategy . Browsers as well as grazers , impala feed on monocots , dicots , forbs , fruits and acacia pods (whenever available) . An annual , three @-@ week @-@ long rut takes place toward the end of the wet season , typically in May . Rutting males fight over dominance , and the victorious male starts an elaborate courtship with a female in oestrus . Gestation lasts six to seven months , following which a single calf is born and immediately concealed in cover . Calves are suckled for four to six months ; young males , forced out of the group , join bachelor herds , while females may stay back .

The impala occurs in woodlands and sometimes on the interface (ecotone) between woodlands and savannahs ; it inhabits places close to water . While the black @-@ faced impala is confined to southwestern Angola and Kaokoland in northwestern Namibia , the common impala is widespread across its range and has been reintroduced in Gabon and southern Africa . The International Union for Conservation of Nature (IUCN) classifies the impala as a species of least concern ; the black @-@ faced subspecies , however , has been classified as a vulnerable species ; as of 2008 , less than 1 @, @ 000 individuals remain in the wild .

= = Etymology = =

The common name " impala " comes from the Zulu name for the animal ; the first recorded use of the name dates back to 1885 . " Rooibok " is its Afrikaans name , and the scientific name is *Aepyceros melampus* ; *Aepyceros* comes from the Greek words ????? aipos (" high ") and ????? ceros (" horn ") . The specific epithet *melampus* derives from the Greek words ????? melas (" black ") and ????? pous (" foot ") .

= = Taxonomy and evolution = =

The impala is the sole member of the genus *Aepyceros* and belongs to the family Bovidae . It was first described by German zoologist Martin Hinrich Carl Lichtenstein in 1812 . In 1984 , palaeontologist Elisabeth Vrba opined that the impala is a sister taxon to the alcelaphines given its resemblance to the hartebeest . A 1999 phylogenetic study by Alexandre Hassanin (of the National Centre for Scientific Research , Paris) and colleagues , based on mitochondrial and nuclear analyses , showed that the impala forms a clade with the suni (*Neotragus moschatus*) . This clade is sister to another formed by the bay duiker (*Cephalophus dorsalis*) and the klipspringer (*Oreotragus oreotragus*) . An rRNA and ? @-@ spectrin nuclear sequence analysis in 2003 also supported an association between *Aepyceros* and *Neotragus* . The following cladogram is based on the 1999 study :

Up to six subspecies have been described , although only two are generally recognised on the basis of mitochondrial data . Though morphologically similar , the subspecies show a significant genetic distance between them , and no hybrids between them have been reported .

A. m. melampus Lichtenstein , 1812 : Known as the common impala , it occurs across eastern and southern Africa . The range extends from central Kenya to South Africa and westward into southeastern Angola .

A. m. petersi Bocage , 1879 : Known as the black @-@ faced impala , it is restricted to southwestern Africa , occurring in northwestern Namibia and southwestern Angola .

According to Vrba , the impala evolved from an alcelaphine ancestor . She noted that while this ancestor has diverged at least 18 times into various morphologically different forms , the impala has continued in its basic form for at least five million years . Several fossil species have been discovered , including *A. datoadeni* from the Pliocene of Ethiopia . The oldest fossil discovered suggests its ancient ancestors were slightly smaller than the modern form , but otherwise similar in all aspects to the latter . This implies that the impala has efficiently adapted to its environment since prehistoric times . Its gregarious nature , variety in diet , positive population trend , defence against ticks and symbiotic relationship with the tick @-@ feeding oxpeckers could have played a role in preventing major changes in morphology and behaviour .

= = Description = =

The impala is a medium @-@ sized , slender antelope similar to the kob or Grant 's gazelle in build . The head @-@ and @-@ body length is around 130 centimetres (51 in) . Males reach approximately 75 ? 92 centimetres (30 ? 36 in) at the shoulder , while females are 70 ? 85 centimetres (28 ? 33 in) tall . Males typically weigh 53 ? 76 kilograms (117 ? 168 lb) and females 40 ? 53 kilograms (88 ? 117 lb) . Sexually dimorphic , females are hornless and notably smaller than males . Males grow slender , lyre @-@ shaped horns 45 ? 92 centimetres (18 ? 36 in) long . The horns , strongly ridged and divergent , are circular in section and hollow at the base . Their arch @-@ like structure allows interlocking of horns , which helps a male throw off his opponent during fights ; horns also protect the skull from damage .

The glossy coat of the impala shows two @-@ tone colouration ? the reddish brown back and the tan flanks ; these are in sharp contrast to the white underbelly . Facial features include white rings around the eyes and a light chin and snout . The ears , 1 @-@ 7 centimetres (0 @-@ 67 in) long , are tipped with black . Black streaks run from the buttocks to the upper hindlegs . The bushy white tail , 30 centimetres (12 in) long , features a solid black stripe along the midline . The impala 's colouration bears a strong resemblance to the gerenuk , which has shorter horns and lacks the black thigh stripes of the impala . The impala has scent glands covered by a black tuft of hair on the hindlegs . Sebaceous glands concentrated on the forehead and dispersed on the torso of dominant males are most active during the mating season , while those of females are only partially developed and do not undergo seasonal changes . There are four nipples .

Of the subspecies , the black @-@ faced impala is significantly larger and darker than the common impala ; a recessive gene is responsible for the black colouration . Distinctive of the black @-@ faced impala is a dark stripe , on either side of the nose , that runs upward to the eyes and thins as it reaches the forehead . Other differences include the larger black tip on the ear , and a bushier and nearly 30 % longer tail in the black @-@ faced impala .

The impala has a special dental arrangement on the front lower jaw similar to the toothcomb seen in strepsirrhine primates , which is used during allogrooming to comb the fur on the head and the neck and remove ectoparasites .

= = Ecology and behaviour = =

The impala is diurnal (active mainly during the day) , though activity tends to cease during the hot midday hours ; they feed and rest at night . Three distinct social groups can be observed ? the territorial males , bachelor herds and female herds . The territorial males hold territories where they may form harems of females ; territories are demarcated with urine and faeces and defended against juvenile or male intruders . Bachelor herds tend to be small , with less than 30 members . Individuals maintain distances of 2 @-@ 5 ? 3 metres (8 @-@ 2 ? 9 @-@ 8 ft) from one another ; while young and old males may interact , middle @-@ aged males generally avoid one another . The membership of female herds varies from 6 to 100 ; herds occupy home ranges of 80 ? 180 hectares (200 ? 440 acres ; 0 @-@ 31 ? 0 @-@ 69 sq mi) . The mother @-@ calf bond is weak ,

and breaks soon after weaning ; juveniles leave the herds of their mothers to join other herds . Female herds tend to be loose and have no distinct leadership . Allogrooming is an important means of social interaction in bachelor and female herds ; in fact , the impala appears to be the only ungulate to display self @-@ grooming as well as allogrooming . In allogrooming , females typically groom related individuals , while males associate with unrelated individuals . Each partner grooms the other six to twelve times .

Social behaviour is influenced by the climate and geography ; as such , the impala are territorial at certain times of the year and gregarious at other times , and the length of these periods can vary broadly among populations . For instance , populations in southern Africa display territorial behaviour only during the few months of the rut , whereas in eastern African populations , territoriality is relatively minimal despite a protracted mating season . Moreover , territorial males often tolerate bachelors , and may even alternate between bachelorhood and territoriality at different times of the year . A study of impala in the Serengeti National Park showed that in 94 % of the males , territoriality was observed for less than four months .

The impala is an important prey for several carnivores , such as cheetahs , leopards and lions . The antelope displays two characteristic leaps ? it can jump up to 3 metres (9 @.@ 8 ft) , over vegetation and even other impala , covering distances of up to 10 metres (33 ft) ; the other type of leap involves a series of jumps in which the animal lands on its forelegs , moves its hindlegs mid @-@ air in a kicking fashion , lands on all fours and then rebounds . It leaps in either manner in different directions , probably to confuse predators . At times , the impala may also conceal itself in vegetation to escape the eye of the predator . The most prominent vocalisation is the loud roar , delivered through one to three loud snorts with the mouth closed , followed by two to ten deep grunts with the mouth open and the chin and tail raised ; a typical roar can be heard up to 2 kilometres (1 @.@ 2 mi) away . Scent gland secretions identify a territorial male . A notable feature of impala is their sedentary nature ; adult and middle @-@ aged males , in particular , can hold their territories for years .

= = = Parasites = = =

Common ixodid ticks collected from impala include *Amblyomma hebraeum* , *Boophilus decoloratus* , *Hyalomma marginatum* , *Ixodes cavipalpus* , *Rhipicephalus appendiculatus* and *R. evertsi* . In Zimbabwe , heavy infestation by ticks such as *R. appendiculatus* has proved to be a major cause behind the high mortality of ungulates , as they can lead to tick paralysis . Impala have special adaptations for grooming , such as their characteristic dental arrangement , to manage ticks before they engorge ; however , the extensive grooming needed to keep the tick load under control involves the risk of dehydration during summer , lower vigilance against predators and gradual wearing out of the teeth . A study showed that impala adjust the time devoted to grooming and the number of grooming bouts according to the seasonal prevalence of ticks .

Impala are symbiotically related to oxpeckers , which feed on ticks from those parts of the antelope 's body which the animal cannot access by itself (such as the ears , neck , eyelids , forehead and underbelly) . The impala is the smallest ungulate that oxpeckers are associated with . In a study it was observed that oxpeckers selectively attended to impala despite the presence of other animals such as Coke 's hartebeest , Grant 's gazelle , Thompson 's gazelle and topi . A possible explanation for this could be that because the impala inhabits woodlands (which can have a high density of ticks) , the impala could have greater mass of ticks per unit area of the body surface . Another study showed that the oxpeckers prefer the ears over other parts of the body , probably because these parts show maximum tick infestation .

Lice recorded from impala include *Damalinia aepycerus* , *D. elongata* , *Linognathus aepycerus* and *L. nevillei* ; in a study , ivermectin (a medication against parasites) was found to have an effect on *Boophilus decoloratus* and *Linognathus* species , though not on *Damalinia* species . In a study of impala in South Africa , the number of worms in juveniles showed an increase with age , reaching a peak when impala turned a year old . This study recorded worms of genera such as *Cooperia* , *Cooperoides* , *Fasciola* , *Gongylonema* , *Haemonchus* , *Impalaia* , *Longistrongylus* and

Trichostrongylus ; some of these showed seasonal variations in density .

= = = Diet = = =

Impala browse as well as graze ; either may predominate , depending upon the availability of resources . The diet comprises monocots , dicots , forbs , fruits and acacia pods (whenever available) . Impala prefer places close to water sources , and resort to succulent vegetation if water is scarce . An analysis showed that the diet of impala is composed of 45 % monocots , 45 % dicots and 10 % fruits ; the proportion of grasses in the diet increases significantly (to as high as 90 %) after the first rains , but declines in the dry season . Browsing predominates in the late wet and dry season , and diets are nutritionally poor in the mid @-@ dry season , when impala feed mostly on woody dicots . Another study showed that the dicot proportion in the diet is much higher in bachelors and females than in territorial males .

Impala feed on soft and nutritious grasses such as *Digitaria macroblephora* ; tough , tall grasses , such as *Heteropogon contortus* and *Themeda triandra* , are typically avoided . Impala on the periphery of the herds are generally more vigilant against predators than those feeding in the centre ; a foraging individual will try to defend the patch it is feeding on by lowering its head . A study revealed that time spent in foraging reaches a maximum of 75 @.@ 5 % of the day in the late dry season , decreases through the rainy season , and is minimal in the early dry season (57 @.@ 8 %) .

= = = Reproduction = = =

Males are sexually mature by the time they are a year old , though successful mating generally occurs only after four years . Mature males start establishing territories and try to gain access to females . Females can conceive after they are a year and a half old ; oestrous lasts for 24 to 48 hours , and occurs every 12 ? 29 days in non @-@ pregnant females . The annual three @-@ week @-@ long rut (breeding season) begins toward the end of the wet season , typically in May . Gonadal growth and hormone production in males begin a few months before the breeding season , resulting in greater aggressiveness and territoriality . The bulbourethral glands are heavier , testosterone levels are nearly twice as high in territorial males as in bachelors , and the neck of a territorial male tends to be thicker than that of a bachelor during the rut . Mating tends to take place between full moons .

Rutting males fight over dominance , often giving out noisy roars and chasing one another ; they walk stiffly and display their neck and horns . Males desist from feeding and allogrooming during the rut , probably to devote more time to garnering females in oestrus ; the male checks the female 's urine to ensure that she is in oestrus . On coming across such a female , the excited male begins the courtship by pursuing her , keeping a distance of 3 ? 5 metres (9 @.@ 8 ? 16 @.@ 4 ft) from her . The male flicks his tongue and may nod vigorously ; the female allows him to lick her vulva , and holds her tail to one side . The male tries mounting the female , holding his head high and clasping her sides with his forelegs . Mounting attempts may be repeated every few seconds to every minute or two . The male loses interest in the female after the first copulation , though she is still active and can mate with other males .

Gestation lasts six to seven months ; the mother may even delay giving birth for an additional month if conditions are harsh . Births generally occur in the midday ; the female will isolate herself from the herd when labour pain begins . A single calf is born , and is immediately concealed in cover for the first few weeks of its birth . The fawn then joins a nursery group within its mother 's herd . Calves are suckled for four to six months ; young males , forced out of the group , join bachelor herds , while females may stay back .

= = Distribution and habitat = =

The impala inhabits woodlands due to its preference for shade ; it can also occur on the interface (

ecotone) between woodlands and savannahs . Places close to water sources are preferred . In southern Africa , populations tend to be associated with *Colophospermum mopane* and *Acacia* woodlands . Habitat choices differ seasonally ? *Acacia senegal* woodlands are preferred in the wet season , and *A. drepanolobium* savannahs in the dry season . Another factor that could influence habitat choice is vulnerability to predators ; impala tend to keep away from areas with tall grasses as predators could be concealed there . A study found that the reduction of woodland cover and creation of shrublands by the African bush elephants has favoured impala population by increasing the availability of more dry season browse . Earlier , the *Baikiaea* woodland , which has now declined due to elephants , provided minimum browsing for impala . The newly formed *Capparis* shrubland , on the other hand , could be a key browsing habitat . Impala are generally not associated with montane habitats ; however , in KwaZulu @-@ Natal , impala have been recorded at altitudes of up to 1 @,@ 400 metres (4 @,@ 600 ft) above sea level .

The historical range of the impala , spanning across southern and eastern Africa , has remained intact to a great extent , although it has disappeared from a few places such as Burundi . The range extends from central and southern Kenya and northeastern Uganda in the east to northern KwaZulu @-@ Natal in the south , and westward up to Namibia and southern Angola . The black @-@ faced impala is confined to southwestern Angola and Kaokoland in northwestern Namibia ; the status of this subspecies has not been monitored since the 2000s . The common impala has a wider distribution , and has been introduced in protected areas in Gabon and across southern Africa .

= = Threats and conservation = =

The International Union for Conservation of Nature and Natural Resources (IUCN) classifies the impala as a species of least concern overall ; the black @-@ faced impala , however , is classified as a vulnerable species ; as of 2008 , fewer than 1 @,@ 000 individuals are estimated in the wild . Though there are no major threats to the survival of the common impala , poaching and natural calamities have significantly contributed to the decline of the black @-@ faced impala . As of 2008 , the population of the common impala has been estimated at around two million . According to some studies , translocation of the black @-@ faced impala can be highly beneficial in its conservation .

Around a quarter of the common impala populations occur in protected areas , such as the Okavango Delta (Botswana) ; Masai Mara and Kajiado (Kenya) ; Kruger National Park (South Africa) ; the Ruaha and Serengeti National Parks and Selous Game Reserve (Tanzania) ; Luangwa Valley (Zambia) ; Hwange , Sebungwe and Zambezi Valley (Zimbabwe) . The rare black @-@ faced impala has been introduced into private farms in Namibia and the Etosha National Park . Population densities vary largely from place to place ; from less than one individual per square kilometre in Mkomazi National Park (Tanzania) to as high as 135 individuals per square kilometre near Lake Kariba (Zimbabwe) .