

= Elk =

The elk , or wapiti (*Cervus canadensis*) , is one of the largest species within the deer family , Cervidae , in the world , and one of the largest land mammals in North America and Eastern Asia . This animal should not be confused with the larger moose (*Alces alces*) to which the name " elk " applies in the British Isles and Eurasia . Apart from the moose , the only other member of the deer family to rival the elk in size is the south Asian sambar (*Rusa unicolor*) .

Elk range in forest and forest @-@ edge habitat , feeding on grasses , plants , leaves , and bark . Male elk have large antlers which are shed each year . Males also engage in ritualized mating behaviors during the rut , including posturing , antler wrestling (sparring) , and bugling , a loud series of vocalizations that establishes dominance over other males and attracts females .

Although they are native to North America and eastern Asia , they have adapted well to countries in which they have been introduced , including Argentina , Australia and New Zealand . Their great adaptability may threaten endemic species and ecosystems into which they have been introduced .

Elk are susceptible to a number of infectious diseases , some of which can be transmitted to livestock . Efforts to eliminate infectious diseases from elk populations , largely by vaccination , have had mixed success .

Some cultures revere the elk as a spiritual force . In parts of Asia , antlers and their velvet are used in traditional medicines . Elk are hunted as a game species . The meat is leaner and higher in protein than beef or chicken .

It was long believed to be a subspecies of the European red deer (*Cervus elaphus*) , but evidence from a number of mitochondrial DNA genetic studies beginning in 1998 show that the two are distinct species . Key morphological differences that distinguish *C. canadensis* from *C. elaphus* are the former 's wider rump patch and paler @-@ hued antlers .

= = Naming and etymology = =

Early European explorers in North America , who were familiar with the smaller red deer of Europe , thought that the larger North American animal resembled a moose , and consequently gave it the name elk , which is the common European name for moose . The word elk is related to the Latin *alces* , Old Norse *elgr* , Scandinavian *elg* / *älg* and German *Elch* , all of which refer to the animal known in North America as the moose .

The name wapiti is from the Shawnee and Cree word *waapiti* , meaning " white rump " . This name is used in particular for the Asian subspecies (Altai wapiti , Tian Shan wapiti , Manchurian wapiti and Alashan wapiti) , because in Eurasia the name elk continues to be used for the moose .

Asian subspecies are sometimes referred to as the maral , but this name applies primarily to the Caspian red deer (*Cervus elaphus maral*) , a subspecies of red deer . There is a subspecies of elk in Mongolia called the Altai wapiti (*Cervus canadensis sibiricus*) , also known as the Altai maral . (The name " Siberian elk " is used for *Alces alces* ssp. *cameloides* .)

= = Taxonomy = =

Members of the genus *Cervus* (and hence early relatives or possible ancestors of the elk) first appear in the fossil record 25 million years ago , during the Oligocene in Eurasia , but do not appear in the North American fossil record until the early Miocene . The extinct Irish elk (*Megaloceros*) was not a member of the genus *Cervus* , but rather the largest member of the wider deer family (Cervidae) known from the fossil record .

Until recently , red deer and elk were considered to be one species , *Cervus elaphus* . However , mitochondrial DNA studies , conducted on hundreds of samples in 2004 from red deer and elk subspecies as well as other species of the *Cervus* deer family , strongly indicate that elk , or wapiti , should be a distinct species , namely *Cervus canadensis* . The previous classification had over a dozen subspecies under the *C. elaphus* species designation ; DNA evidence concludes that elk are more closely related to Thorold 's deer and even sika deer than they are to the red deer . Though elk

and red deer can produce fertile offspring in captivity , geographic isolation between the species in the wild and differences in mating behaviors indicate that reproduction between them outside a controlled environment would be unlikely . However , the two species have freely inter @-@ bred in New Zealand 's Fiordland National Park , where the cross @-@ bred animals have all but removed the pure elk blood from the area .

= = = Subspecies = = =

There are numerous subspecies of elk described , with six from North America and four from Asia , although some taxonomists consider them different ecotypes or races of the same species (adapted to local environments through minor changes in appearance and behavior) . Populations vary as to antler shape and size , body size , coloration and mating behavior . DNA investigations of the Eurasian subspecies revealed that phenotypic variation in antlers , mane and rump patch development are based on " climatic @-@ related lifestyle factors " . Of the six subspecies of elk known to have inhabited North America in historical times , four remain , including the Roosevelt (*C. canadensis roosevelti*) , tule (*C. canadensis nannodes*) , Manitoban (*C. canadensis manitobensis*) and Rocky Mountain (*C. canadensis nelsoni*) . The eastern elk (*C. canadensis canadensis*) and Merriam 's elk (*C. canadensis merriami*) subspecies have been extinct for at least a century .

Four subspecies described in Asia include the Altai wapiti (*C. canadensis sibiricus*) and the Tianshan wapiti (*C. canadensis songaricus*) . Two distinct subspecies found in China and Korea are the Manchurian wapiti (*C. canadensis xanthopygus*) and the Alashan wapitis (*C. canadensis alashanicus*) . The Manchurian wapiti is darker and more reddish in coloration than the other populations . The Alashan wapiti of north central China is the smallest of all subspecies , has the lightest coloration and is the least studied . Biologist Valerius Geist , who has written on the world 's various deer species , holds that there are only three subspecies of elk . Geist recognizes the Manchurian and Alashan wapiti but places all other elk into *C. canadensis canadensis* , claiming that classification of the four surviving North American groups as subspecies is driven , at least partly , for political purposes to secure individualized conservation and protective measures for each of the surviving populations .

Recent DNA studies suggest that there are no more than three or four subspecies of elk . All American forms seem to belong to one subspecies (*Cervus canadensis canadensis*) . Even the Siberian elk (*Cervus canadensis sibiricus*) are more or less identical to the American forms and therefore may belong to this subspecies , too . However the Manchurian wapiti (*Cervus canadensis xanthopygus*) is clearly distinct from the Siberian forms , but not distinguishable from the Alashan wapiti . The Chinese forms MacNeill 's deer , Kansu red deer , and Tibetan red deer belong also to the wapitis and were not distinguishable from each other by mitochondrial DNA studies . These Chinese subspecies are sometimes treated as a distinct species , namely the Central Asian red deer (*Cervus wallichi*) , which also includes the Kashmir stag .

Northern and American group

Roosevelt elk (*C. c. roosevelti*)

Tule elk (*C. c. nannodes*)

Manitoban elk (*C. c. manitobensis*)

Rocky Mountain elk (*C. c. nelsoni*)

Eastern elk (*C. c. canadensis* ; extinct)

Merriam 's elk (*C. c. merriami* ; extinct)

Altai wapiti (*C. c. sibiricus*)

Tian Shan wapiti (*C. c. songaricus*)

Eastern group

Manchurian wapiti (*C. c. xanthopygus*)

Alashan wapiti (*C. c. alashanicus*)

Southern group (Central Asian red deer)

MacNeill 's deer (*C. c. macneilli*)

Kansu red deer (*C. c. kansuensis*)

Tibetan red deer (*C. c. wallichii*)
Kashmir stag (*C. c. hanglu*)

= = Biology = =

= = = Anatomy = = =

The elk is a large animal of the ungulate order Artiodactyla , possessing an even number of toes on each foot , similar to those of camels , goats and cattle . It is a ruminant species , with a four @-@ chambered stomach , and feeds on grasses , plants , leaves and bark . During the summer , elk eat almost constantly , consuming between 4 and 7 kilograms (8 @.@ 8 and 15 @.@ 4 lb) of vegetation daily . In North America , males are called bulls , and females are called cows . In Asia , stag and hind , respectively , are sometimes used instead .

Elk are more than twice as heavy as mule deer and have a more reddish hue to their hair coloring , as well as large , buff colored rump patches and smaller tails . Moose are larger and darker than elk ; bulls have distinctively different antlers . Elk gather in herds , while moose are solitary . Elk cows average 225 to 241 kg (496 to 531 lb) , stand 1 @.@ 3 m (4 @.@ 3 ft) at the shoulder , and are 2 @.@ 1 m (6 @.@ 9 ft) from nose to tail . Bulls are some 40 % larger than cows at maturity , weighing an average of 320 to 331 kg (705 to 730 lb) , standing 1 @.@ 5 m (4 @.@ 9 ft) at the shoulder and averaging 2 @.@ 45 m (8 @.@ 0 ft) in length . The largest of the subspecies is the Roosevelt elk (*C. c. roosevelti*) , found west of the Cascade Range in the U.S. states of California , Oregon and Washington , and in the Canadian province of British Columbia . Roosevelt elk have been reintroduced into Alaska , where the largest males are estimated to weigh up to 600 kg (1 @.@ 300 lb) . More typically , male Roosevelt elks weigh around 300 to 544 kg (661 to 1 @.@ 199 lb) , while females weigh 260 to 285 kg (573 to 628 lb) . The smallest @-@ bodied race is the tule elk (*C. c. nannodes*) , which weighs from 170 to 250 kg (370 to 550 lb) in both sexes .

Only the males have antlers , which start growing in the spring and are shed each winter . The largest antlers may be 1 @.@ 2 metres (3 @.@ 9 ft) long and weigh 18 kilograms (40 lb) . Antlers are made of bone which can grow at a rate of 2 @.@ 5 centimetres (0 @.@ 98 in) per day . While actively growing , the antlers are covered with and protected by a soft layer of highly vascularised skin known as velvet . The velvet is shed in the summer when the antlers have fully developed . Bull elk may have eight or more tines on each antler ; however , the number of tines has little to do with the age or maturity of a particular animal . The Siberian and North American elk carry the largest antlers while the Altai wapiti have the smallest . The formation and retention of antlers is testosterone @-@ driven . After the breeding season in late fall , the level of pheromones released during estrus declines in the environment and the testosterone levels of males drop as a consequence . This drop in testosterone leads to the shedding of antlers , usually in the early winter .

During the fall , elk grow a thicker coat of hair , which helps to insulate them during the winter . Males , females and calves of Siberian and North American elk all grow thin neck manes ; female and young Manchurian and Alaskan wapitis do not . By early summer , the heavy winter coat has been shed , and elk are known to rub against trees and other objects to help remove hair from their bodies . All elk have small and clearly defined rump patches with short tails . They have different coloration based on the seasons and types of habitats , with gray or lighter coloration prevalent in the winter and a more reddish , darker coat in the summer . Subspecies living in arid climates tend to have lighter colored coats than do those living in forests . Most have lighter yellow @-@ brown to orange @-@ brown coats in contrast to dark brown hair on the head , neck , and legs during the summer . Forest @-@ adapted Manchurian and Alaskan wapitis have darker reddish @-@ brown coats with less contrast between the body coat and the rest of the body during the summer months . Calves are born spotted , as is common with many deer species , and they lose their spots by the end of summer . Adult Manchurian wapiti may retain a few orange spots on the back of their summer coats until they are older . This characteristic has also been observed in the forest @-@

adapted European red deer .

= = = Behavior = = =

Adult elk usually stay in single @-@ sex groups for most of the year . During the mating period known as the rut , mature bulls compete for the attentions of the cow elk and will try to defend females in their harem . Rival bulls challenge opponents by bellowing and by paralleling each other , walking back and forth . This allows potential combatants to assess the other 's antlers , body size and fighting prowess . If neither bull backs down , they engage in antler wrestling , and bulls sometimes sustain serious injuries . Bulls also dig holes in the ground , in which they urinate and roll their body . A male elk 's urethra points upward so that urine is sprayed almost at a right angle to the penis . The urine soaks into their hair and gives them a distinct smell which attracts cows .

Dominant bulls follow groups of cows during the rut , from August into early winter . A bull will defend his harem of 20 cows or more from competing bulls and predators . Only mature bulls have large harems and breeding success peaks at about eight years of age . Bulls between two and four years and over 11 years of age rarely have harems , and spend most of the rut on the periphery of larger harems . Young and old bulls that do acquire a harem hold it later in the breeding season than do bulls in their prime . A bull with a harem rarely feeds and he may lose up to 20 percent of his body weight . Bulls that enter the rut in poor condition are less likely to make it through to the peak conception period or have the strength to survive the rigors of the oncoming winter .

Bulls have a loud vocalization consisting of screams known as bugling , which can be heard for miles . Bugling is often associated with an adaptation to open environments such as parklands , meadows , and savannas , where sound can travel great distances . Females are attracted to the males that bugle more often and have the loudest call . Bugling is most common early and late in the day and is one of the most distinctive sounds in nature , akin to the howl of the gray wolf .

= = = Reproduction and lifecycle = = =

Female elk have a short estrus cycle of only a day or two , and matings usually involve a dozen or more attempts . By the autumn of their second year , females can produce one and , very rarely , two offspring , although reproduction is most common when cows weigh at least 200 kilograms (440 lb) . The gestation period is 240 to 262 days and the offspring weigh between 15 and 16 kilograms (33 and 35 lb) . When the females are near to giving birth , they tend to isolate themselves from the main herd , and will remain isolated until the calf is large enough to escape predators . Calves are born spotted , as is common with many deer species , and they lose their spots by the end of summer . Manchurian wapiti may retain a few orange spots on the back of their summer coats until they are older . After two weeks , calves are able to join the herd , and are fully weaned at two months of age . Elk calves are as large as an adult white @-@ tailed deer by the time they are six months old . The offspring will remain with their mothers for almost a year , leaving about the time that the next season 's offspring are produced . The gestation period is the same for all subspecies .

Elk live 20 years or more in captivity but average 10 to 13 years in the wild . In some subspecies that suffer less predation , they may live an average of 15 years in the wild .

= = = Predators and defensive tactics = = =

Wolf and coyote packs and the solitary cougar are the most likely predators , although brown and black bears also prey on elk . Coyote packs mostly prey on elk calves , though they can sometimes take a winter @-@ weakened adult . In the Greater Yellowstone Ecosystem which includes Yellowstone National Park , bears are the most significant predators of calves . Major predators in Asia include the wolf , dhole , brown bear , Siberian tiger , Amur leopard , and snow leopard . Eurasian lynx and wild boar sometimes prey on Asian elk calves . Historically , tigers in the Lake Baikal region fed on Manchurian wapiti , and continue to do so in the Amur region .

Male elk retain their antlers for more than half the year and are less likely to group with other males when they have antlers . Antlers provide a means of defense , as does a strong front @-@ leg kick , which is performed by either sex if provoked . Once the antlers have been shed , bulls tend to form bachelor groups which allow them to work cooperatively at fending off predators . Herds tend to employ one or more scouts while the remaining members eat and rest .

After the rut , females form large herds of up to 50 individuals . Newborn calves are kept close by a series of vocalizations ; larger nurseries have an ongoing and constant chatter during the daytime hours . When approached by predators , the largest and most robust females may make a stand , using their front legs to kick at their attackers . Guttural grunts and posturing effectively deter all but the most determined predators .

= = = Migration = = =

As is true for many species of deer , especially those in mountainous regions , elk migrate into areas of higher altitude in the spring , following the retreating snows , and the opposite direction in the fall . Hunting pressure also impacts migration and movements . During the winter , they favor wooded areas and sheltered valleys for protection from the wind and availability of tree bark to eat . Roosevelt elk are generally non @-@ migratory due to less seasonal variability of food sources .

The Greater Yellowstone Ecosystem elk herd numbers over 200 @, @ 000 individuals and during the spring and fall , they take part in the longest elk migration in the continental U.S. Elk in the southern regions of Yellowstone National Park and in the surrounding National Forests migrate south towards the town of Jackson , Wyoming , where they winter for up to six months on the National Elk Refuge . Conservationists there ensure the herd is well fed during the harsh winters . Many of the elk that reside in the northern sections of the Greater Yellowstone Ecosystem migrate to lower altitudes in Montana , mainly to the north and west .

= = = Diet = = =

Elk are ruminants and therefore have four @-@ chambered stomachs . Unlike white @-@ tailed deer and moose which are primarily browsers , elk have a similarity to cattle as they are primarily grazers , but like other deer , they also browse . Elk have a tendency to do most of their feeding in the mornings and evenings , seeking sheltered areas in between feedings to digest . Their diets vary somewhat depending on the season , with native grasses being a year @-@ round supplement , tree bark being consumed in winter and forbs and tree sprouts during the summer . Elk consume an average of 9 @. @ 1 kilograms (20 lb) of various vegetation daily . Particularly fond of aspen sprouts which rise in the spring , elk have had some impact on aspen groves which have been declining in some regions where elk exist .

Range and wildlife managers conduct surveys of elk pellet groups to monitor populations and resource use .

= = = Parasites and disease = = =

At least 53 species of protist and animal parasites have been identified in elk . Most of these parasites seldom lead to significant mortality among wild or captive elk . Parelaphostrongylus tenuis (brainworm or meningeal worm) is a parasitic nematode known to affect the spinal cord and brain tissue of elk and other species , leading to death . The definitive host is the white @-@ tailed deer , in which it normally has no ill effects . Snails and slugs , the intermediate hosts , can be inadvertently consumed by elk during grazing . The liver fluke Fascioloides magna and the nematode Dictyocaulus viviparus are also commonly found parasites that can be fatal to elk . Since infection by either of these parasites can be lethal to some commercial livestock species , their presence in elk herds is of some concern .

Chronic wasting disease , transmitted by a misfolded protein known as a prion , affects the brain tissue in elk , and has been detected throughout their range in North America . First documented in

the late 1960s in mule deer , the disease has affected elk on game farms and in the wild in a number of regions . Elk that have contracted the disease begin to show weight loss , increased watering needs , disorientation and listlessness , and at an advanced stage the disease leads to death . The disease is similar to but not the same as mad cow disease , and no risks to humans have been documented , nor has the disease been demonstrated to pose a threat to domesticated cattle . In 2002 , South Korea banned the importation of elk antler velvet due to concerns about chronic wasting disease .

The Gram @-@ negative bacterial disease brucellosis occasionally affects elk in the Greater Yellowstone Ecosystem , the only place in the U.S. where the disease is still known to exist . In domesticated cattle , brucellosis causes infertility , abortions and reduced milk production . It is transmitted to humans as undulant fever , producing flu @-@ like symptoms which may last for years . Though bison are more likely to transmit the disease to other animals , elk inadvertently transmitted brucellosis to horses in Wyoming and cattle in Idaho . Researchers are attempting to eradicate the disease through vaccinations and herd management measures , which are expected to be successful .

A recent necropsy study of captive elk in Pennsylvania attributed the cause of death in 33 of 65 cases to either gastrointestinal parasites (21 cases , primarily *Eimeria* sp. and *Ostertagia* sp .) or bacterial infections (12 cases , mostly pneumonia) .

= = Ecology = =

= = = Distribution = = =

Modern subspecies are descended from elk that once inhabited Beringia , a steppe region between Asia and North America that connected the two continents during the Pleistocene . Beringia provided a migratory route for numerous mammal species , including brown bear , camel , horse , caribou , and moose , as well as humans . As the Pleistocene came to an end , ocean levels began to rise ; elk migrated southwards into Asia and North America . In North America they adapted to almost all ecosystems except for tundra , true deserts , and the gulf coast of the U.S. The elk of southern Siberia and central Asia were once more widespread but today are restricted to the mountain ranges west of Lake Baikal including the Sayan and Altai Mountains of Mongolia and the Tianshan region that borders Kyrgyzstan , Kazakhstan , and China 's Xinjiang Province . The habitat of Siberian elk in Asia is similar to that of the Rocky Mountain subspecies in North America .

Throughout their range , they live in forest and in forest edge habitat , similar to other deer species . In mountainous regions , they often dwell at higher elevations in summer , migrating down slope for winter . The highly adaptable elk also inhabit semi @-@ deserts in North America , such as the Great Basin . Manchurian and Alashan wapiti are primarily forest dwellers and their smaller antler size is a likely adaptation to a forest environment .

= = = Introductions = = =

The Rocky Mountain elk subspecies has been reintroduced by hunter @-@ conservation organizations in the Appalachian region of the eastern U.S. , where the now extinct eastern elk once lived After elk were reintroduced in the states of Kentucky , North Carolina and Tennessee , they migrated into the neighboring states of Virginia and West Virginia , and have established permanent populations there . Elk have also been reintroduced to a number of other states , including Pennsylvania , Michigan , Wisconsin , and Etolin and Afognak Islands in Alaska . As of 1989 , population figures for the Rocky Mountain subspecies were 782 @,@ 500 , and estimated numbers for all North American subspecies exceeded 1 million . Prior to the European colonization of North America , there were an estimated 10 million elk on the continent .

Outside their native habitat , elk and other deer species , especially white tails , were introduced in areas that previously had few if any large native ungulates . Brought to these countries for hunting

and ranching for meat , hides and antler velvet , they have proven highly adaptable and have often had an adverse impact on local ecosystems . Elk and red deer were introduced to Argentina in the early 20th century . There they are now considered an invasive species , encroaching on Argentinian ecosystems where they compete for food with the indigenous Chilean huemul and other herbivores . This negative impact on native animal species has led the IUCN to identify the elk as one of the world 's 100 worst invaders . Both elk and red deer have also been introduced into Australia .

The introduction of deer to New Zealand began in the middle of the 19th century , and current populations are primarily European red deer , with only 15 percent being elk . There is significant hybridization of elk with the more numerous red deer to the extent that pure elk may no longer exist in the wild in New Zealand . These deer have had an adverse impact on forest regeneration of some plant species , as they consume more palatable species which are replaced with those that are less favored by the elk . The long @-@ term impact will be an alteration of the types of plants and trees found , and in other animal and plant species dependent upon them . As in Chile and Argentina , the IUCN has declared that red deer and elk populations in New Zealand are an invasive species .

= = Cultural references = =

Elk have played an important role in the cultural history of a number of peoples . Pictograms and petroglyphs of elk were carved into cliffs thousands of years ago by the Anasazi of the southwestern U.S. More recent Native American tribes , including the Kootenai , Cree , Blackfeet , Ojibwa and Pawnee , produced blankets and robes from elk hides . The elk was of particular importance to the Lakota , and played a spiritual role in their society . At birth , Lakota males were given an elk 's tooth to promote a long life since that was seen as the last part of dead elk to rot away . The elk was seen as having strong sexual potency and young Lakota males who had dreamed of elk would have an image of the mythical representation of the elk on their " courting coats " as a sign of sexual prowess . The Lakota believed that the mythical or spiritual elk , not the physical one , was the teacher of men and the embodiment of strength , sexual prowess and courage .

Neolithic petroglyphs from Asia depict antler @-@ less female elk , which have been interpreted as symbolizing rebirth and sustenance . By the beginning of the Bronze Age , the elk is depicted less frequently in rock art , coinciding with a cultural transformation away from hunting .

The Rocky Mountain elk is the official state animal for Utah . An image of an elk and a moose appear on the state seal and flag of Michigan . The Benevolent and Protective Order of Elks (B.P.O.E.) chose the elk as its namesake because a number of its attributes seemed appropriate for cultivation by members of the fraternity . A representation of the majestic head of the male , with its spreading antlers , was adopted as the first badge of the Order ; and is still the most conspicuous element of its copyrighted fraternal emblem . A prized possession of many members of the B.P.O.E. are jewel encrusted , gold mounted elk teeth ? which are actually ivory .

= = Commercial uses = =

Although breakdown figures for each game species are not available in the 2006 National Survey from the U.S. Fish and Wildlife Service , hunting of wild elk is most likely the primary economic impact .

Elk are held in captivity , or farmed , for hunting , meat production and velvet collection . In what is known as a canned hunt , a hunter pays a fee for an essentially guaranteed chance to shoot an elk in an escape @-@ proof range . While elk are not generally harvested for meat production on a large scale , some restaurants offer the meat as a specialty item and it is also available in some grocery stores . The meat has a taste somewhere between beef and venison and is higher in protein and lower in fat and cholesterol than beef , pork , and chicken . Elk meat is also a good source of iron , phosphorus and zinc .

A male elk can produce 10 to 11 kilograms (22 to 24 lb) of antler velvet annually and on ranches in the United States , Canada and New Zealand , this velvet is collected and sold to markets in East

Asia , where it is used in medicine . Velvet is also considered by some cultures to be an aphrodisiac . However , consuming velvet from elk in North America may be risky since velvet from animals infected with chronic wasting disease may contain prions that could result in a human getting variant Creutzfeldt - Jakob disease .

Antlers are also used in artwork , furniture and other novelty items . All Asian subspecies , along with other deer , have been raised for their antlers in central and eastern Asia by Han Chinese , Turkic peoples , Tungusic peoples , Mongolians , and Koreans . Elk farms are relatively common in North America and New Zealand .

Elk hides have been used for thousands of years for tepee covering , blankets , clothing and footwear . Modern uses are more decorative , but elk skin shoes , gloves and belts are not uncommon .

Since 1967 , the Boy Scouts of America have assisted employees at the National Elk Refuge in Wyoming by collecting the antlers which are shed each winter . The antlers are then auctioned with 80 % of the proceeds returned to the refuge . In 2010 , 2 @, @ 520 kilograms (5 @, @ 560 lb) of antlers were auctioned , bringing in over \$ 46 @, @ 000 .