

= Ring @-@ tailed lemur =

The ring @-@ tailed lemur (*Lemur catta*) is a large strepsirrhine primate and the most recognized lemur due to its long , black and white ringed tail . It belongs to Lemnidae , one of five lemur families , and is the only member of the Lemur genus . Like all lemurs it is endemic to the island of Madagascar . Known locally in Malagasy as maky ([mak?] , spelled maki in French) or hira , it inhabits gallery forests to spiny scrub in the southern regions of the island . It is omnivorous and the most terrestrial of extant lemurs . The animal is diurnal , being active exclusively in daylight hours .

The ring @-@ tailed lemur is highly social , living in groups of up to 30 individuals . It is also female dominant , a trait common among lemurs . To keep warm and reaffirm social bonds , groups will huddle together . The ring @-@ tailed lemur will also sunbathe , sitting upright facing its underside , with its thinner white fur towards the sun . Like other lemurs , this species relies strongly on its sense of smell and marks its territory with scent glands . The males perform a unique scent marking behavior called spur marking and will participate in stink fights by impregnating their tail with their scent and wafting it at opponents .

As one of the most vocal primates , the ring @-@ tailed lemur uses numerous vocalizations including group cohesion and alarm calls . Experiments have shown that the ring @-@ tailed lemur , despite the lack of a large brain (relative to simiiform primates) , can organize sequences , understand basic arithmetic operations and preferentially select tools based on functional qualities .

Despite reproducing readily in captivity and being the most populous lemur in zoos worldwide , numbering more than 2 @,@ 000 individuals , the ring @-@ tailed lemur is listed as endangered by the IUCN Red List due to habitat destruction and hunting for bush meat and the exotic pet trade .

= = Etymology = =

Although the term " lemur " was first intended for slender lorises , it was soon limited to the endemic Malagasy primates , which have been known as " lemurs " ever since . The name derives from the Latin term lemures , which refers to specters or ghosts that were exorcised during the Lemuria festival of ancient Rome . According to Carl Linnaeus ' own explanation , the name was selected because of the nocturnal activity and slow movements of the slender loris . Being familiar with the works of Virgil and Ovid and seeing an analogy that fit with his naming scheme , Linnaeus adapted the term " lemur " for these nocturnal primates . However , it has been commonly and falsely assumed that Linnaeus was referring to the ghost @-@ like appearance , reflective eyes , and ghostly cries of lemurs . It has also been speculated that Linnaeus may also have known that the some Malagasy people have held legends that lemurs are the souls of their ancestors , but this is unlikely given that the name was selected for slender lorises from India . The species name , catta , refers to the ring @-@ tailed lemur 's cat @-@ like appearance . Its purring vocalization is similar to that of the domestic cat .

Following Linnaeus ' species description , the common name " ringtailed maucauco " was first penned in 1771 by Welsh naturalist Thomas Pennant , who made note of its characteristic long , striped tail . (The term " maucauco " was a common term for lemurs at this time .) The now universal English name " ring @-@ tailed lemur " was first used by George Shaw in his illustrated scientific publication covering the Leverian collection published between 1792 and 1796 .

= = Evolutionary history = =

All mammalian fossils from Madagascar come from recent times . Thus , little is known about the evolution of the ring @-@ tailed lemur , let alone the rest of the lemur clade , which comprises the entire endemic primate population of the island . However , chromosomal and molecular evidence suggest that lemurs are more closely related to each other than to other Strepsirrhine primates . For this to have happened , it is thought that a very small ancestral population came to Madagascar via a single rafting event between 50 and 80 million years ago . Subsequent evolutionary radiation and speciation has created the diversity of Malagasy lemurs seen today .

According to analysis of amino acid sequences , the branching of the family Lemuridae has been dated to $26 \pm 1 \pm 3$ mya while rRNA sequences of mtDNA place the split at $24 \pm 9 \pm 3$ mya . The ruffed lemurs are the first genus to split away (most basal) in the family , a view that is further supported by analysis of DNA sequences and karyotypes . Additionally , Molecular data suggests a deep genetic divergence and sister group relationship between the true lemurs (*Eulemur*) and the remaining three genera : *Lemur* , *Hapalemur* , and *Prolemur* .

The ring tailed lemur is thought to share closer affinities to the bamboo lemurs of the genera *Hapalemur* and *Prolemur* than to the other two genera in its family . This has been supported by comparisons in communication , chromosomes , genetics , and several morphological traits , such as scent gland similarities . However , other data concerning immunology and other morphological traits fail to support this close relationship . For example , *Hapalemur* and *Prolemur* have short snouts , while the ring tailed lemur and the rest of Lemuridae have long snouts . However , differences in the relationship between the orbit (eye socket) and the muzzle suggest that the ring tailed lemur and the true lemurs evolved their elongated faces independently .

The relationship between the ring tailed lemur and bamboo lemurs (both *Hapalemur* and *Prolemur*) is the least understood . Molecular analysis suggests that either the bamboo lemurs diverged from the ring tailed lemur , making the group monophyletic and supporting the current 3 genera taxonomy , or that the ring tailed lemur is nested in with the bamboo lemurs .

The karyotype of the ring tailed lemur has 56 chromosomes , of which four are metacentric (arms of nearly equal length) , four are submetacentric (arms of unequal length) , and 46 are acrocentric (the short arm is hardly observable) . The X chromosome is metacentric and the Y chromosome is acrocentric .

== Taxonomic classification ==

Linnaeus first used the genus name *Lemur* to describe "*Lemur tardigradus*" (the red slender loris , now known as *Loris tardigradus*) in his 1754 catalog of the Museum of King Adolf Frederick . In 1758 , his 10th edition of *Systema Naturae* listed the genus *Lemur* with three included species , only one of which is still considered to be a lemur while another is no longer considered to be a primate . These species include : *Lemur tardigradus* , *Lemur catta* (the ring tailed lemur) , and *Lemur volans* (the Philippine colugo , now known as *Cynocephalus volans*) . In 1911 , Oldfield Thomas made *Lemur catta* the type species for the genus , despite the term initially being used to describe lorises . On January 10 , 1929 , the International Commission on Zoological Nomenclature (ICZN) formalized this decision in its publication of Opinion 122 .

The ring tailed lemur shares many similarities with ruffed lemurs (genus *Varecia*) and true lemurs (genus *Eulemur*) , and its skeleton is nearly indistinguishable from that of the true lemurs . Consequently , the three genera were once grouped together in the genus *Lemur* and more recently are sometimes referred to as subfamily Lemurinae (within family Lemuridae) . However , ruffed lemurs were reassigned to the genus *Varecia* in 1962 , and due to similarities between the ring tailed lemur and the bamboo lemurs , particularly in regards to molecular evidence and scent glands similarities , the true lemurs were moved to the genus *Eulemur* by Yves Rumpler and Elwyn L. Simons (1988) as well as Colin Groves and Robert H. Eaglen (1988) . In 1991 , Ian Tattersall and Jeffrey H. Schwartz reviewed the evidence and came to a different conclusion , instead favoring to return the members of *Eulemur* and *Varecia* to the genus *Lemur* . However , this view was not widely accepted and the genus *Lemur* remained monotypic , containing only the ring tailed lemur . Because the differences in molecular data are so minute between the ring tailed lemur and both genera of bamboo lemurs , it has been suggested that all three genera be merged .

Because of the difficulty in discerning the relationships within family Lemuridae , not all authorities agree on the taxonomy , although the majority of the primatological community favors the current classification .

In 1996 , researchers Steven Goodman and Olivier Langrand suggested that the ring tailed lemur may demonstrate regional variations , particularly a high mountain population at Andringitra

Massif that has a thicker coat , lighter coloration , and variations in its tail rings . In 2001 , primatologist Colin Groves concluded that this does not represent a locally occurring subspecies . This decision was later supported by further fieldwork that showed that the differences fell within the normal range of variation for the species . The thicker coat was considered a local adaptation to extreme low temperatures in the region , and the fading of the fur was attributed to increased exposure to solar radiation . Additional genetic studies in 2000 further supported the conclusion that population did not vary significantly from the other ring @-@ tailed lemur populations on the island .

= = Anatomy and physiology = =

The ring @-@ tailed lemur is a relatively large lemur . Its average weight is 2 @. @ 2 kilograms (4 @. @ 9 lb) . Its head ? body length ranges between 39 and 46 cm (15 and 18 in) , its tail length is 56 and 63 cm (22 and 25 in) , and its total length is 95 and 110 cm (37 and 43 in) . Other measurements include a hind foot length of 102 and 113 mm (4 @. @ 0 and 4 @. @ 4 in) , ear length of 40 and 48 mm (1 @. @ 6 and 1 @. @ 9 in) , and cranium length of 78 and 88 mm (3 @. @ 1 and 3 @. @ 5 in) .

The species has a slender frame and narrow face , fox @-@ like muzzle . The ring @-@ tailed lemur 's trademark ? a long , bushy tail ? is ringed in alternating black and white transverse stripes , numbering 12 or 13 white rings and 13 or 14 black rings , and always ending in a black tip . The total number of rings nearly matches the approximate number of caudal vertebrae (~ 25) . Its tail is longer than its body and is not prehensile . Instead , it is only used for balance , communication , and group cohesion .

The pelage (fur) is so dense that it can clog electric clippers . The ventral (chest) coat and throat are white or cream . The dorsal (back) coat varies from gray to rosy @-@ brown , sometimes with a brown pygal patch around the tail region , where the fur grades to pale gray or grayish brown . The dorsal coloration is slightly darker around the neck and crown . The hair on the throat , cheeks , and ears is white or off @-@ white and also less dense , allowing the dark skin underneath to show through . The muzzle is dark grayish and the nose is black , and the eyes are encompassed by black triangular patches . Facial vibrissae (whiskers) are developed and found above the lips (mystacial) , on the cheeks (genal) , and on the eyebrow (superciliary) . Vibrissae are also found slightly above the wrist on the underside of the forearm . The ears are relatively large compared to other lemurs and are covered in hair , which has only small tufts if any . Although slight pattern variations in the facial region may be seen between individuals , there are no obvious differences between the sexes .

Unlike most diurnal primates , but like all strepsirrhine primates , the ring @-@ tailed lemur has a tapetum lucidum , or reflective layer behind the retina of the eye , that enhances night vision . The tapetum is highly visible in this species because the pigmentation of the ocular fundus (back surface of the eye) , which is present in ? but varies between ? all lemurs , is very spotty . The ring @-@ tailed lemur also has a rudimentary foveal depression on the retina . Another shared characteristic with the other strepsirrhine primates is the rhinarium , a moist , naked , glandular nose supported by the upper jaw and protruding beyond the chin . The rhinarium continues down where it divides the upper lip . The upper lip is attached to the premaxilla , preventing the lip from protruding and thus requiring the lemur to lap water rather than using suction .

The skin of the ring @-@ tailed lemur is dark gray or black in color , even in places where the fur is white . It is exposed on the nose , palms , soles , eyelids , lips , and genitalia . The skin is smooth , but the leathery texture of the hands and feet facilitate terrestrial movement . The anus , located at the joint of the tail , is covered when the tail is lowered . The area around the anus (circumanal area) and the perineum are covered in fur . In males , the scrotum lacks fur , is covered in small , horny spines , and the two sacs of the scrotum are divided . The penis is nearly cylindrical in shape and is covered in small spines , as well as having two pairs of larger spines on both sides . Males have a relatively small baculum (penis bone) compared to their size . The scrotum , penis , and prepuce are usually coated with a foul @-@ smelling secretion . Females have a thick , elongated clitoris that protrudes from the labia of the vulva . The opening of the urethra is closer to the clitoris than the

vagina , forming a " drip tip . "

Females have two pairs of mammary glands (four nipples) , but only one pair is functional . The anterior pair (closest to the head) are very close to the axillae (armpit) . Furless scent glands are present on both males and females . Both genders have small , dark antebrachial (forearm) glands measuring 1 cm long and located on the inner surface of the forearm nearly 25 cm (9 @. @ 8 in) above the wrist joint . (This trait is shared between the Lemur and Hapalemur genera .) The gland is soft and compressible , bears fine dermal ridges (like fingerprints) , and is connected to the palm by a fine , 2 mm ? high , hairless strip . However , only the male has a horny spur that overlays this scent gland . The spur develops with age through the accumulation of secretions from an underlying gland that may connect through the skin through as many as a thousand minuscule ducts . The males also have brachial (arm) glands on the axillary surface of their shoulders (near the armpit) . The brachial gland is larger than the antebrachial gland , covered in short hair around the periphery , and has a naked crescent @-@ shaped orifice near the center . The gland secretes a foul @-@ smelling , brown , sticky substance . The brachial gland is barely developed if present at all in females . Both genders also have apocrine and sebaceous glands in their genital or perianal regions , which are covered in fur .

Its fingers are slender , padded , mostly lacking webbing , and semi @-@ dexterous with flat , human @-@ like nails . The thumb is both short and widely separated from the other fingers . Despite being set at a right angle to the palm , the thumb is not opposable since the ball of the joint is fixed in place . As with all strepsirrhines , the hand is ectaxonic (the axis passes through the fourth digit) rather than mesaxonic (the axis passing through the third digit) as seen in monkeys and apes . The fourth digit is the longest , and only slightly longer than the second digit . Likewise , the fifth digit is only slightly longer than the second . The palms are long and leathery , and like other primates , they have dermal ridges to improve grip . The feet are semi @-@ digitigrade and more specialized than the hands . The big toe is opposable and is smaller than the big toe of other lemurs , which are more arboreal . The second toe is short , has a small terminal pad , and has a toilet @-@ claw (sometimes referred to as a grooming claw) specialized for personal grooming , specifically to rake through fur that is unreachable by the mouth . The toilet @-@ claw is a trait shared among nearly all living strepsirrhine primates . Unlike other lemurs , the ring @-@ tailed lemur 's heel is not covered by fur .

= = = Dentition = = =