

= Gray mouse lemur =

The gray mouse lemur (*Microcebus murinus*), grey mouse lemur or lesser mouse lemur , is a small lemur , a type of strepsirrhine primate , found only on the island of Madagascar . Weighing 58 to 67 grams (2 @. @ 0 to 2 @. @ 4 oz) , it is the largest of the mouse lemurs (genus *Microcebus*) , a group that includes the smallest primates in the world . The species is named for its mouse @-@ like size and coloration and is known locally (in Malagasy) as tsidy , koitsiky , titilivaha , pondiky , and vakiandry . The gray mouse lemur and all other mouse lemurs are considered cryptic species , as they are nearly indistinguishable from each other by appearance . For this reason , the gray mouse lemur was considered the only mouse lemur species for decades until more recent studies began to distinguish between the species .

Like all mouse lemurs , this species is nocturnal and arboreal . It is very active , and though it forages alone , groups of males and females form sleeping groups and share tree holes during the day . It exhibits a form of dormancy called torpor during the cool , dry winter months , and in some cases undergoes seasonal torpor (or hibernation) , which is unusual for primates . The gray mouse lemur can be found in several types of forest throughout western and southern Madagascar . Its diet consists primarily of fruit , insects , flowers , and nectar . In the wild , its natural predators include owls , snakes , and endemic mammalian predators . Predation pressure is higher for this species than among any other primate species , with one out of four individuals taken by a predator each year . This is counterbalanced by its high reproductive rate . Breeding is seasonal , and distinct vocalizations are used to prevent hybridization with species that overlap its range . Gestation lasts approximately 60 days , and typically two young are born . The offspring are usually independent in two months , and can reproduce after one year . The gray mouse lemur has a reproductive lifespan of five years , although captive individuals have been reported to live up to 15 years .

Although threatened by deforestation , habitat degradation , and live capture for the pet trade , it is considered one of Madagascar 's most abundant small native mammals . It can tolerate moderate food shortages by experiencing daily torpor to conserve energy , but extended food shortages due to climate change may pose a significant risk to the species .

= = Etymology = =

The gray or lesser mouse lemur is named for its brownish @-@ gray fur and mouse @-@ like size and appearance . The genus name , *Microcebus* , derives from the Greek words mikros , meaning " small " , and kebos , meaning " monkey " . The Latin version of kebos , cebus , is a common suffix used for primate names , despite the fact that the gray mouse lemur is a lemur , and not a monkey . The species name , murinus , means " mouse @-@ like " and derives from the Latin word mus , or " mouse " , and the Latin suffix -inus , which means " like " .

The lemur is known locally by several names in Malagasy , depending upon the region . Around Tôlanaro (Fort Dauphin) , it is called pondiky [pun?dik?] . In the northern end of its range , it is known as tsidy [?t?id?] . Around Morondava , it is referred to as koitsiky [kui?t?ik?] , titilivaha [ti ? tili?va] , and vakiandry [vaki?a????] . In many cases , these Malagasy names are also used for other visually indistinguishable mouse lemur species that live within its range .

= = Taxonomy = =

As its name implies , the gray mouse lemur is a lemur , a type of primate , and belongs to the suborder Strepsirrhini and infraorder Lemuriformes . Within Lemuriformes , it belongs to the family Cheirogaleidae , which contains the mouse lemurs , dwarf lemurs , giant mouse lemurs , fork @-@ marked lemurs , and hairy @-@ eared dwarf lemur . The mouse lemur genus *Microcebus* includes the smallest primates in the world . Phylogenetic analyses of D @-@ loop DNA sequences of various lemur species suggests that the gray mouse lemur may be most closely related to the reddish @-@ gray mouse lemur (*M. griseorufus*) .

First described in 1777 by English illustrator John Frederick Miller , *M. murinus* remained the only

species of its genus , as well as the name used for all mouse lemurs on Madagascar , between the first major taxonomic revision in 1931 and an extensive field study conducted in 1972 . The field study distinguished the brown mouse lemur , *M. rufus* ? then considered a subspecies ? as a distinct , sympatric species in the southeastern part of the island . Upon this revision , the gray mouse lemur was thought to account for all mouse lemurs that lived in the drier parts of the north , west , and south , while the brown mouse lemur represented the eastern rainforest mouse lemurs . More recently , scientific understanding of the distribution and diversity of the mouse lemurs has become much more complex . Additional field studies , genetic testing , and resulting taxonomic revisions throughout the 1990s and 2000s identified numerous new mouse lemur species , demonstrating that the genus includes at least 17 cryptic species .

= = Anatomy and physiology = =

The gray mouse lemur shares many traits with other mouse lemurs , including soft fur , a long tail , long hind limbs , a dorsal stripe down the back (not always distinct) , a short snout , rounded skull , prominent eyes , and large , membranous , protruding ears . It has large eyes and a tapetum lucidum to enhance its vision at night . The dorsal coat is brownish @-@ gray with various reddish tones , the flanks are light gray to beige , and the ventral fur has discrete dull beige or whitish @-@ beige patches along portions of the belly . On the rounded face , there is a pale white patch above the nose and between the eyes ; some individuals have dark orbital markings . The furred portions of the hands and feet are off @-@ white .

The gray mouse lemur is one of the smallest primates in the world , yet it is also the largest mouse lemur . Its total length is 25 to 28 cm (9 @-@ 8 to 11 @-@ 0 in) , with a head @-@ body length of 12 to 14 cm (4 @-@ 7 to 5 @-@ 5 in) and a tail length of 13 to 14 @-@ 5 cm (5 @-@ 1 to 5 @-@ 7 in) . The average weight for this species is 60 g (2 @-@ 1 oz) , with ranges of 58 and 67 g (2 @-@ 0 and 2 @-@ 4 oz) and 40 and 70 g (1 @-@ 4 and 2 @-@ 5 oz) reported . This is smaller than the world 's smallest monkey , the pygmy marmoset , which ranges between 85 and 140 g (3 @-@ 0 and 4 @-@ 9 oz) . Weight varies by season , with both sexes building fat reserves , up to 35 % of their body weight , in the tail and hind legs prior to the dry season and periods of dormancy . The tail of the gray mouse lemur can increase fourfold in volume during the wet season when it is storing fat . Even in captivity when environmental limitations are not an issue , mouse lemurs have shown a seasonal dietary preference with a greater protein intake during what would be their more active season .

Researchers have identified differences in the tooth morphology of the first and second molars between the gray mouse lemur and the reddish @-@ gray mouse lemur . In the reddish @-@ gray mouse lemur , the first lower molar (m1) is squared and both the first and second upper molars (M1 and M2) have slight indentations around the middle of the posterior margin . The gray mouse lemur has a more elongated m1 and lacks the aforementioned indentation on M1 and M2 . In terms of its general dentition , the gray mouse lemur shares the same dental formula as all other members of its family , Cheirogaleidae : $2 @-@ 1 @-@ 3 @-@ 32 @-@ 1 @-@ 3 @-@ 3 \times 2 = 36$

This species has 66 chromosomes , closely resembling the karyotype of the dwarf lemurs (genus *Cheirogaleus*) . Except for the X chromosome , all chromosomes are acrocentric (with the short arm absent or virtually absent) . Its genome size is 3 @-@ 12 picograms (pg) .

= = Ecology = =

Like all other members of the family Cheirogaleidae , the gray mouse lemur is nocturnal and arboreal . It inhabits lowland tropical dry forest , sub @-@ arid thorn scrub , gallery forest , spiny forest , eastern littoral forest , dry deciduous forests , semi @-@ humid deciduous , moist lowland forest , transitional forest , and secondary forests or degraded forests (including plantations) all ranging up to 800 m (2 @-@ 600 ft) above sea level . The species is more common in secondary forest than in primary forest , particularly bush and scrub habitat , where it occupies a " fine branch " niche , restricting the vertical range to fine branches , fine terminal supports , lianas and dense

foliage . These lemurs are usually seen on branches less than 5 cm (2 @. @ 0 in) in diameter . The gray mouse lemur tends to prefer lower levels of the forest and the understory , where branches and vegetation are dense .

In secondary forest , it is generally observed from ground level up to 10 m (33 ft) above ground , yet 15 to 30 m (50 to 100 ft) in the canopy of primary forest . Studies have found that the species can spend as much as 40 % of its time below 3 m (10 ft) , with 70 % of its time spent at this level during the end of the dry season , when plant food is limited and insects compose a larger percentage of the diet . The species is more numerous in spiny forest , such as the Andohahela Special Reserve , than in the gallery forest , preferring drier , littoral forest , whereas the brown mouse lemur prefers inland rain forest .

The limits of the distribution are poorly understood . It is believed to range from the Onilahy River or Lake Tsimanampetsotsa in the south to Ankarafantsika National Park in the north . There is also an isolated and disjointed population in the southeastern part of the island , near Tôlanaro and the Andohahela National Park , up to the Mandena Conservation Zone . Individuals tend to occupy small home ranges of 1 to 2 ha (2 @. @ 5 to 4 @. @ 9 acres) . The gray mouse lemur is also sympatric with the reddish @-@ gray mouse lemur , golden @-@ brown mouse lemur , Madame Berthe 's mouse lemur , and several other cheirogaleid lemurs . In Ankarafantsika National Park , where it coexists with the golden @-@ brown mouse lemur , the gray mouse lemur 's relative population density was highest at higher altitudes and in drier habitat , while the golden @-@ brown mouse lemur preferred the opposite . Another study has looked at the coexistence of the gray mouse lemur and Madame Berthe 's mouse lemur and found small , exclusive clusters of each species and a high degree of feeding niche overlap .

The gray mouse lemur can reach high population densities up to several hundred individuals per square kilometer (up to 167 individuals / km² at Ankarafantsika National Park to 712 individuals / km² at Kirindy Mitea National Park) . This abundance is not uniform and tends to concentrate in " population nuclei " , suggesting that it is difficult to accurately estimate population densities when extrapolating from a small area (from various studies) to a large area . The difficulty in finding individuals during some times of the year , particularly during the dry periods , can further complicate the problem of estimating population densities .

Mouse lemurs are omnivorous , and favor fruit and insects for the bulk of their diet . The gray mouse lemur may even come down to the ground to catch insect prey , though it quickly returns to the protective cover of the understory to consume its catch . Nectar is also a part of the gray mouse lemur 's diet , making it a potential pollinator for local plant species . A single instance of a male cannibalizing an adult female is known .

= = = Predation = = =

The most significant predators of the gray mouse lemur are the Madagascar long @-@ eared owl and barn owl . Studies conducted in Beza Mahafaly Reserve and Kirindy Mitea National Park indicate a predation rate of around 25 % (percent population taken by predators per year) , the highest known for any primate species . However , given the species ' high reproductive potential , predation does not appear to have a drastic effect on its populations . Other raptors , such as Henst 's goshawk and other owls , also prey upon this species . Snakes , such as *Ithycyphus miniatus* (a native colubrid snake) and the Madagascar tree boa , as well as mammalian predators , such as the ring @-@ tailed mongoose , narrow @-@ striped mongoose , fossa , and domestic dogs are also known to prey on the gray mouse lemur . Mammalian predators often discover tree holes serving as nests , and enlarge the opening so they can catch and eat the occupant . This puts strong selective pressure on the choice of nest hole opening diameter and deepness .

Due to its non @-@ gregarious nature , the gray mouse lemur , like other nocturnal lemurs , primarily defends itself from predators using avoidance strategies , although group defense through the use of alarm calls and predator mobbing has been observed in this species . Studies involving the placement of predator and non @-@ predator fecal odor with captive populations have demonstrated a genetic predisposition for predator recognition through the detection of metabolites

from meat digestion . The mouse lemurs were shown to avoid locations where they typically received rewards , as well as exhibit increased activity and anti @-@ predator behavior , when the odor of predator feces were present in that vicinity , but not when the fecal odor of Malagasy non @-@ predators was present .

During the day , when they are most vulnerable , individuals shelter inside tree holes , sometimes forming nests . They may use three to nine different tree holes within their home range , yet individuals may use one particular hole for up to five consecutive days . Mouse lemurs tend to prefer tree hollows , but also commonly make spherical constructions out of leaves . Nests are usually found in tree holes with a minimum diameter of 5 cm (2 @.@ 0 in) , with a median of 13 cm (5 @.@ 1 in) , suggesting that this range in diameter of tree holes may be crucial for maintaining a healthy habitat . The gray mouse lemur also spends most of its time in dense vegetation , limiting its visibility and accessibility to predators . Furthermore , it has a high reproductive rate to counter losses to predation .

= = Behavior = =

The gray mouse lemur is nocturnal , sleeping during the day in tree holes lined with leaf litter or purpose @-@ built spherical nests constructed from dead leaves , moss and twigs . It usually forages alone at night , but may sleep in groups during the day , the composition of which depends on gender and season . Tree holes can be shared with up to 15 other individuals , although males tend to sleep alone while females tend to share nests .

All mouse lemurs are highly active at night , often scurrying like mice and leaping over 3 m (9 @.@ 8 ft) , using the tail as a balancing organ . When moving among the terminal branches of bushes and trees , they grip using all four feet and move with four legs . When on the ground , either to catch insects or cross short open areas , mouse lemurs hop like a frog . When hunting , the grey mouse lemur is known to catch invertebrates and small vertebrates with quick hand grasps .

In the dry season , the gray mouse lemur faces the challenge of exploiting sparsely distributed feeding resources efficiently . Results of a recent study on this showed that the gray mouse lemur does not move around randomly , but rather use spatial cues to find food resources in the absence of sensory cues , and that they seem to reuse common , highly efficient routes with regard to travel distance . It is believed that rather than using a route @-@ based network , the gray mouse lemur has some sense of mental representation of their spatial environment , which they use to find and exploit food resources .

Foraging behavior is often slow , with height and direction changing continuously . Predation of insects occurs primarily on the ground . Before descending , the ear pinnae move alternately to help pinpoint the precise location of their prey . Insects are captured during a rapid dash across the leaf litter and are transported by mouth up into the relative safety of the branches . Studies with captive gray mouse lemurs have shown that vision is primarily used for prey detection , although the other senses certainly play a role in foraging .

The gray mouse lemur is omnivorous , feeding primarily on fruit and invertebrates . Local populations appear to specialize on locally available fruit . At both Marosalaza and Mandena , beetles are the primary insect prey , although moths , praying mantids , fulgorid bugs , crickets , cockroaches , and spiders are also eaten . Less than half the diet consists of insects , with fruit making up a slightly larger fraction . This lemur also consumes flowers , gums and nectar from Euphorbia and Terminalia trees , leaves (Uapaca sp .) , exudates (Homopteran larvae secretions) , and small vertebrates such as tree frogs , geckos , and chameleons . Its diet is seasonally varied and diverse in content , giving it a very broad feeding niche compared to other species such as the Madame Berthe 's mouse lemur . Therefore , it is affected more by food availability than by niche partitioning where sympatry occurs .

= = = Dormancy = = =

As with all members of the mouse lemur genus , the gray mouse lemur is known to enter short

states of daily torpor , particularly during the cool , dry Southern Hemisphere winter . This rare trait in primates , coupled with the ease of observing the species within its wide geographic distribution and its good representation in captivity , makes it a popular subject for research as a model organism .

The gray mouse lemur is unique among the mouse lemurs studied so far because it is the only species to exhibit prolonged seasonal torpor , but this behavior has only been observed to occur in one locality . Activity patterns can differ noticeably between sexes as well as populations . At the Ampijoroa Forestry Station in Ankarafantsika National Park , males and females exhibit daily , rather than seasonal torpor . At Kirindy Forest , both sexes share the same daily torpor , yet during the dry season (April / May through September / October) , females become completely inactive for several weeks or up to five months to conserve energy and reduce predation . However , males rarely remain inactive for more than a few days and become extremely active before the females revive from torpor , allowing them to establish hierarchies and territories for the breeding season . The use of alternative energy @-@ saving strategies under the same environmental conditions was observed directly in 2008 , providing the first physiological confirmation from the field . This pattern of seasonal versus daily torpor may relate to the seasonality of the region , since Kirindy is the only location west of the eastern mountain rainforests that experiences very low temperatures at night during the winter months . By entering extended torpor , sometimes referred to as hibernation , this would reduce the thermoregulatory stress in females , whereas males remain more active in preparation for the upcoming mating season . No difference in mortality has been shown between hibernating females and active males .

During torpor , the gray mouse lemur 's metabolic rate slows and its body temperature drops to the ambient temperature , as low as 7 ° C (45 ° F) . During the cooler months of May through August , the species selects tree holes closer to ground level , where ambient temperatures remain more stable . This allows them to remain in torpor longer , and to conserve metabolic resources . One study showed that during the breeding season , both males and females reduced their energy expenditure by 20 % when they nested in pairs , and a maximal energetic benefit of 40 % was achieved when three mouse lemurs nested together . Even during the nonbreeding season , maximal energetic gain was observed two or more animals nested together , because resting metabolic rate was already decreased .

While the gray mouse lemur is found in both primary and secondary deciduous forests , they have lower population densities in secondary forests . This is because variations in gray mouse lemur abundance are linked to their capacity to enter torpor during the dry season , especially for females , which tend to hibernate longer than males . In primary forests , they can maintain daily torpor or hibernation as long as their body temperatures remain below 28 ° C (82 ° F) , but in secondary forests that have fewer large trees , temperatures are higher and inhibit the gray mouse lemur 's ability to maintain torpor for prolonged periods of time . In addition , the gray mouse lemur in secondary forests tend to have a lower body mass than those in primary forests , as well as lower survival rates . This is likely because those with lower body mass are less likely to enter torpor , and therefore expend around 40 % more energy than those that do maintain torpor .

This unusual ability for a primate to exhibit dormancy , in addition to the diminutive size , has led researchers to speculate that ancestral lemurs , and possibly ancestral primates , may have shared some traits with mouse lemurs . Consequently , the gray mouse lemur has once again been used as a model organism for studying lemur and primate evolution . For example , lemurs are thought to have colonized Madagascar by rafting to the island around 60 million years ago according to molecular phylogenetic studies . Before the discovery that ocean currents were the opposite of what they are today , thus favoring such an event , it was thought that it would have taken too long for any animal not capable of entering a state of dormancy to survive the trip . Therefore , the mouse lemurs , such as the gray mouse lemur , were thought to have shared this plesiomorphic (ancestral) trait with the ancestral lemurs .

= = = Social systems = = =

The gray mouse lemur is described as solitary but social , foraging alone at night , but frequently sleeping in groups during the day . This social pattern varies by gender , season , and location . Females tend to share nests with other females and their offspring , whereas males tend to sleep alone or in pairs outside of the breeding season . Groups of females sharing a nest can be relatively stable , consisting of two to nine individuals , although a male may be found with a group of females outside the breeding season . During the breeding season (September through October) , males and females may sleep in the same tree hole . Mixed sex groups can be common at this time , with single males sharing nest sites with three to seven females or single females sharing nest sites with one to three males .

Research has shown that home ranges for the gray mouse lemur are usually small , possibly less than 50 m (160 ft) . Males typically travel further at night and have home ranges that are twice as large as those of females , often overlapping with one another , and always overlapping with at least one female 's home range . Male home ranges increase threefold during the breeding season .

Female home ranges overlap less than those of males , although localized concentrations , or " population nuclei " , tend to form in some areas , where the sex ratio favors females to males by three or four to one at the nucleus core . Genetic studies indicate that females arrange themselves spatially in clusters (" population nuclei ") of related individuals , while males tend to emigrate from their natal group . Research has shown that females in this species may maintain smaller ranges and associate more closely with other females than in some other mouse lemur species due to a more opportunistic feeding niche and , in the case of populations at Kirindy , the use of extended , seasonal torpor .

= = = Communication = = =

Vocalizations and scent are the primarily modes of communication within this species . Home ranges are scent marked with urine and feces . Vocalizations are complex and very high @-@ pitched (ranging from 10 to 36 kHz) , sometimes beyond the range of human hearing (0 @.@ 02 to 20 kHz) . These include calls for seeking contact , mating , distant communication , alarm , and distress .

Like other mouse lemurs , the gray mouse lemur uses what has been described as a harmonic whistle call that is lower in frequency and shorter in duration than its close relative , the brown mouse lemur . In addition , it has been found that the types of vocalizations emitted by the gray mouse lemur can be dependent upon the environment . In the more open dry forest habitats favored by the gray mouse lemur , trill calls are more common and effective since they carry faster and are less likely to be masked by the wind , while chirp calls are more common in the brown mouse lemur , which favors closed rain forest habitats .

As with other social mammals , the calls reveal the sex and identity of the individual . Dialects have also been detected between communities . The male trill call , part of the male mating display , is much like a bird song in terms of its ordered sequence of broadband frequency modulated syllables , ranging between 13 and 35 kHz in pitch and lasting 0 @.@ 3 to 0 @.@ 9 seconds , repeating up to 1 @.@ 5 times per minute . Each locality has its own theme of trill calls that is distinct from those of neighboring communities , and resident males produce individually distinct trill calls within that theme . These calls are not genetically programmed . During play , young males produce early attempts at the trill call , which show high degrees of variability . Research has shown that the male mouse lemurs consciously manipulate the dialect to resemble those of their neighbors , when transferred from their home to a new neighborhood . This may reduce aggression and foster social acceptance for emigrant males as they transfer from their natal group upon maturity .

Because mouse lemurs are cryptic species , and therefore visually indistinguishable , their social calls help individuals select mates of their own species . This differentiated signaling and recognition system has promoted species cohesiveness through premating isolation , and helped researchers distinguish and identify species .

= = = Breeding and reproduction = = =

The mating system is described as multi male and multi female . Males establish dominance hierarchies prior to the mating season , however , some studies in the wild have shown no male aggression or visible competition for receptive females . Males in captivity become highly aggressive and form strict dominance hierarchies . These captive males may show the highest plasma testosterone levels found in mammals , and even the odor of a dominant male can lower the testosterone levels and sexually inhibit a subordinate male . During the breeding season , male testes increase significantly in size , facilitating sperm competition due to female promiscuity . Studies with the gray mouse lemur have shown that the optimal insemination period , during which a male is most likely to sire offspring , occurs early during a female 's receptivity . Only during the mating season does male mortality rise above that of female mortality .

Although the gray mouse lemur displays multi male , multi female mating patterns , studies have shown that females do exhibit indirect mate selection (a form of selected polyandry) . During the study , females would mate with 1 ? 7 males up to 11 times during their single night of receptivity , but would avoid or counteract males that attempted to monopolize mating . Dominant males that attempt to monopolize tend to be larger and heavier individuals . Female selection however , has been shown to help increase genetic diversity among offspring .

The gray mouse lemur is considered overall sexually monomorphic , but seasonally fluctuating sexual dimorphism in terms of body mass has been recorded . While the body mass of both sexes fluctuates over the year as a function of food availability , being highest in the rainy season , the differing behavioral repertoires of the sexes lead to sex specific patterns in this fluctuation . For example , male body mass increases prior to the mating season due to a substantial increase in testes volume that likely enhances the males ' success in sperm competition .

The females are receptive for 45 to 55 days between September and October , with estrus lasting 1 to 5 days . Females advertise estrus by distinctive high frequency calls and scent marking . Gestation lasts 54 to 68 days , averaging 60 days , typically resulting in 2 or 3 offspring weighing 5 g (0 . 18 oz) each . Infants are born in a leaf nest or tree hole in November prior to the onset of the rainy season . Weaning occurs after 25 days , and the infants are either left in the nest or carried in the mother 's mouth and deposited on a branch while she forages . Infant mouse lemurs do not cling to the mother 's fur . Independence is attained in 2 months , while sexual maturity is reached at 10 to 29 months in females and 7 to 19 months in males . Closely related females remain loosely associated after maturation (female philopatry) , whereas males disperse from their natal area . In the wild , the gray mouse lemur 's reproductive lifespan is no more than 5 years , although captive specimens have reportedly lived as long as 15 years and 5 months .

The gray mouse lemur uses cooperative breeding as a form of family insurance . The female regularly transfers her offspring to other females ' nests ? and likewise grooms and cares for offspring other than her own . While this can have a high physiological cost on a lactating female that is already expending a lot of energy , it can be beneficial overall to insuring survival among closely related groups with high mortality risk . A study that took place over three breeding seasons showed that closely related females form breeding groups mainly when there is a shortage of suitable roosts ; when there is an advantage of a communal nest for defense , or when there are thermoregulatory benefits . In the event of offspring adoption , when a parent dies and a closely related female takes over care , it is believed that this is beneficial to groups with high mortality risk .

= = Conservation status = =

The gray mouse lemur was listed in Appendix 1 by the Convention on International Trade in Endangered Species (CITES) in 1975 , declaring it as threatened with extinction and prohibiting international trade of specimens except for non commercial use , such as scientific research . The 2008 International Union for Conservation of Nature (IUCN) Red List assessment lists it as a species of least concern (LC) with a decreasing population trend .

Its greatest threats are habitat loss from slash and burn agriculture and cattle

grazing , as well as live capture for the local pet trade in the northern and southern parts of its range . Although this species inhabits secondary forests , studies have shown that decreased habitat quality adversely affects its populations since fewer tree holes offer fewer opportunities to conserve energy , increasing stress and mortality . One study found nine species of parasites in the fecal matter of the gray mouse lemur living in forests that suffered degradation and fragmentation . In small fragments of good quality forest , as well as forests with high levels of degradation , the gray mouse lemur showed a higher prevalence of parasitic nematodes and protozoans than those in larger good quality forest fragments . Studies in the late 1960s and 1970s showed that heavy logging between 1968 and 1970 seemed to result in decreased body weight , the use of smaller trees for nesting sites , and a smaller maximum female nesting group size (down to 7 from 15) . There is also a concern that although daily torpor can help conserve energy and resources during moderate food shortages , extended food shortages brought about by climate change could create too much stress and severely impact the survivability of the species .

The gray mouse lemur is considered one of Madagascar 's most abundant small native mammals , found in seven national parks , five special reserves , the Berenty Private Reserve , and other privately protected forests within the Mandena Conservation Zone .

This species of mouse lemur breeds very well in captivity , although it is not commonly displayed in zoos like some larger , diurnal lemurs . In 1989 , more than 370 individuals were housed by 14 International Species Information System (ISIS) and non @-@ ISIS institutions across the United States and Europe , 97 % of which were captive born . In March 2009 , 167 were registered at 29 ISIS institutions , including the Duke Lemur Center .