

= Small @-@ toothed sportive lemur =

The small @-@ toothed sportive lemur ( *Lepilemur microdon* ), or small @-@ toothed weasel lemur , is a primate species in the family Lepilemuridae that ? like all lemurs ? is endemic to Madagascar . The species lives in dense rainforest in southeastern Madagascar , and can be found in Ranomafana and Andringitra National Parks . Described in 1894 , it was considered either a subspecies or taxonomic synonym of the weasel sportive lemur ( *Lepilemur mustelinus* ) throughout most of the 20th century . Phylogenetic studies not only support its species status , but also suggest that it is the only eastern Malagasy sportive lemur that is more closely related to western than to other eastern species .

According to the original description , some of its teeth are smaller than those in other sportive lemurs . It is relatively large for a sportive lemur , and is difficult to visually distinguish from the weasel sportive lemur . The species weighs between 0 @. @ 9 and 1 @. @ 2 kg ( 2 @. @ 0 and 2 @. @ 6 lb ) and measures 55 to 64 cm ( 22 to 25 in ) from head to tail . Its fur is mostly reddish @-@ brown or chestnut color , with a dark stripe running from its head down its back . Its underside and neck are lighter in color . Like other sportive lemurs , it is nocturnal , sleeping in concealed tangles of vegetation as well as tree holes . The small @-@ toothed sportive lemur is solitary and eats leaves , fruits , and flowers .

Due to recent taxonomic changes and a lack of clarity about its population size and range , it is listed as " Data Deficient " by the International Union for Conservation of Nature ( IUCN ) . It is also protected from international commercial trade under CITES Appendix I. Its primary threats are habitat loss to slash @-@ and @-@ burn agriculture and hunting .

= = Taxonomy and phylogeny = =

The small @-@ toothed sportive lemur or small @-@ toothed weasel lemur , a member of the sportive lemur genus ( *Lepilemur* ) , was first described in 1894 by Charles Immanuel Forsyth Major , based on a specimen found in the Ankafana Forest in the eastern districts of the former Betsileo province in central Madagascar . Although Forsyth Major did not explicitly state the origins of either the scientific name or the vernacular name , he did note that it had smaller molar teeth relative to other sportive lemurs . The species name *microdon* is derived from the Ancient Greek *micro-* , meaning " small " and *-odon* , meaning " tooth . "

Until the 1990s , there was some dispute over the taxonomic status of the species . For much of the 20th century , the small @-@ toothed sportive lemur was considered a subspecies of the weasel sportive lemur ( *Lepilemur mustelinus* ) . In his book *The Primates of Madagascar* from 1982 , primatologist Ian Tattersall deviated from the traditional view by considering *L. microdon* a synonym of the weasel sportive lemur , while also recognizing only a single species of sportive lemur . Tattersall based his decision on what he considered to be a lack of detailed anatomical studies and field surveys , while also factoring in the difficulty in observing the animals in the wild , the presence of only subtle variations among museum specimens , and his own unwillingness to consider differences in karyotypes as grounds for defining distinct species . However , primatologist Russell Mittermeier , et al. in *Lemurs of Madagascar* ( 1994 ) , taxonomist Colin Groves in *Mammal Species of the World* ( 2005 ) , and others favored recognizing the small @-@ toothed sportive lemur as a species while also recognizing a total of seven sportive lemur species .

A cytogenetic ( chromosome ) study by Nicole Andriaholinirina , et al. published in 2005 added strong support to the species status of the small @-@ toothed sportive lemur by demonstrating that its karyotype was distinct from all other sport lemur species . The species has 24 chromosomes (  $2n = 24$  ) ; the autosomal pairs ( not sex chromosomes ) include eight that are meta- or submetacentric ( where chromosome arms are equal or unequal in length , respectively ) and three smaller acrocentric pairs ( with the shorter chromosome arm difficult to observe ) . Both the X and Y chromosomes are acrocentric . The study also showed that the small @-@ toothed sportive lemur was the sportive lemur species most genetically distinct from the weasel sportive lemur , despite their similar appearance . A total of 18 chromosomal rearrangements distinguished the two species ,

indicating that if the two shared the same range , hybrids would be either completely sterile or suffer greatly reduced fertility .

In September 2006 , Edward E. Louis , Jr . , et al. announced the discovery of 11 new species of sportive lemur based on mitochondrial DNA ( mtDNA ) data . Each new species resulted from the splitting of existing species . In the case of the small @-@ toothed sportive lemur , the population at Kalambatritra Reserve became known as Wright 's sportive lemur ( *Lepilemur wrightae* ) , the population at Andohahelo National Park became Fleurete 's sportive lemur ( *L. fleuretae* ) , the population in Fandriana became Betsileo sportive lemur ( *L. betsileo* ) , and the population at Manombo Reserve became James ' sportive lemur ( *L. jamesorum* ) . The small @-@ toothed sportive lemur remains a distinct species , while even more species have since been described , though none within its range .

Between 2006 and 2009 , three studies were published to resolve the phylogenetic relationships between the sportive lemurs . Cytogenetic and molecular studies in 2006 and 2008 concluded that the small @-@ toothed sportive lemur is most closely related to the Milne @-@ Edwards ' sportive lemur ( *Lepilemur edwardsi* ) . In 2009 , a study examined every known species , including the species most recently described , using two pieces of mtDNA : the D @-@ loop and an array of genes known as the PAST fragment . The resulting data placed the sportive lemurs into four groups : Section A from northern and northwestern Madagascar , section B from northwestern Madagascar , section C from west central and southern Madagascar , and section D from eastern Madagascar . Only the small @-@ toothed sportive lemur generated conflicting results when comparing the results between the mtDNA and D @-@ loop data . The PAST data placed it in section B , while the D @-@ loop data placed it in section C. The relationship between the small @-@ toothed sportive lemur , an eastern Malagasy species , and a group of species from the west coast of Madagascar suggests that the ancestral population of the small @-@ toothed sportive lemur dispersed to its current range from western Madagascar using river corridors . However , the conflicting data about the relationship of the small @-@ toothed sportive lemur to either section B or section C render the precise dispersal route uncertain .

#### = = Description = =

Compared to other sportive lemurs , the small @-@ toothed sportive lemur is relatively large , weighing between 0 @.@ 9 and 1 @.@ 2 kg ( 2 @.@ 0 and 2 @.@ 6 lb ) and measuring 55 to 64 cm ( 22 to 25 in ) from head to tail . Its head @-@ body length is 27 to 32 cm ( 11 to 13 in ) , and its tail measures between 25 and 29 cm ( 9 @.@ 8 and 11 @.@ 4 in ) . The species is nearly identical in coloration to the weasel sportive lemur and it is almost impossible to separate the two in the field , except on the basis of geography . The small @-@ toothed sportive lemur has a dark stripe in the center of its forehead that lightens as it runs down the back . Its pelage ( fur ) is thick and reddish @-@ brown , while its underside and neck are pale gray @-@ brown , and sometimes have a yellowish or yellowish @-@ gray hue . The shoulders and forelimbs have a bright chestnut color . The color darkens to russet between the shoulders , down to the hind @-@ limbs and tail . The tail is darkest at the tip . Some individuals are reported to have a characteristic collar of white fur .

Like all sportive lemurs , they can easily be confused with woolly lemurs ( genus *Avahi* ) , and sometimes with the much smaller dwarf lemurs ( genus *Cheirogaleus* ) . Unlike the woolly lemurs , sportive lemurs have prominent ears , and they lack the white patches usually found on the thighs of woolly lemurs . All sportive lemurs have long legs compared to their arms and trunk and the face is covered with short hairs .

According to a review by Henry Ogg Forbes in 1894 , the species differs from other sportive lemurs ? as its name suggests ? by having significantly smaller molar teeth . Forbes also claimed that compared with the weasel sportive lemur , its bony palate is longer and it has a depression at the base of the nasal ( nose ) region . Like other sportive lemurs , the cecum ( beginning of the large intestine ) is enlarged , presumably to handle its leaf @-@ rich diet , which is more characteristic of larger primates .

## = = Habitat and distribution = =

The small @-@ toothed sportive lemur is found in inland southeastern Madagascar , ranging from Ranomafana National Park southwest to Andringitra National Park . The Namorona River acts as the northern border of its range , and the Manampatrana River may act as a southern border , where the species seems to be replaced by the James ' sportive lemur . Further studies are needed to clarify its range and relationship with other sportive lemurs in southeastern Madagascar . The species inhabits dense rainforest .

A preliminary study at Ranomafana National Park in 1995 indicated the small @-@ toothed sportive lemur may avoid competing with woolly lemurs for food ( interspecific competition ) by living in more disturbed areas of the park . Woolly lemur population density ( and thus competition for food ) appeared to affect the species distribution more than the availability of sleep sites .

## = = Behavior and ecology = =

Like all sportive lemurs , the small @-@ toothed sportive lemur is nocturnal , sleeping in tree cavities or hidden tangles of vines and leaves during the day . The species is considered solitary , and like other rainforest @-@ dwelling sportive lemurs , they vocalize significantly less than sportive lemurs that live in drier forests . Other similarities with the rest of the sportive lemur species include its diet of leaves , fruits , and flowers , its low resting metabolic rate , and its low activity rate .

In general , predators of sportive lemurs include diurnal birds of prey and carnivores , such as the fossa . The only recorded instance of predation on the small @-@ toothed sportive lemur was by a Henst 's goshawk ( *Accipiter henstii* ) .

## = = Conservation = =

The small @-@ toothed sportive lemur is listed under CITES Appendix I , which prohibits international commercial trade . The IUCN originally listed the species as " Lower Risk " , first in 1996 under the sub @-@ classification " least concern " , and then in 2000 under the sub @-@ classification " near threatened " . Prior to the taxonomic changes that resulted in many new species of sportive lemur , the small @-@ toothed sportive lemur was considered to have a widespread distribution , but its range is now thought to be more restricted . During its 2008 assessment , its population size , geographic range , and other factors were unclear , resulting in the classification " Data Deficient " . Given the known threats the species faces , and as its distribution becomes better known , the IUCN states that the species may merit " Threatened " status in the future .

Like many species of lemur , it is threatened with habitat loss from slash and burn agriculture and by increasing hunting pressure . It is hunted with spears and is also captured when trees with sleeping holes are cut down . The small @-@ toothed sportive lemur is known to occur in both Ranomafana and Andringitra National Parks , although it may also be found in Midongy du sud National Park . However , this national park is at the extreme southern end of its geographic range , and the sportive lemurs there may actually represent a population of Fleurete 's sportive lemur .

According to the International Species Information System ( ISIS ) , no small @-@ toothed sportive lemurs were maintained in captivity as of 2009 .