= Macrotarsomys petteri =

Macrotarsomys petteri , also known as Petter 's big @-@ footed mouse , is a Malagasy rodent in the genus Macrotarsomys . With a head and body length of 150 mm (5 @.@ 9 in) and body mass of 105 g (3 @.@ 7 oz) , Macrotarsomys petteri is the largest species of its genus . The upperparts are brown , darkest in the middle of the back , and the underparts are white to yellowish . The animal has long whiskers , short forelimbs , and long hindfeet . The tail ends in a prominent tuft of long , light hairs . The skull is robust and the molars are low @-@ crowned and cuspidate .

Macrotarsomys petteri is now found only in the Mikea Forest of southwestern Madagascar , but subfossil records indicate that it used to be more widely distributed in southern Madagascar . Climatic changes and competition with introduced species may have led to the shift in its distribution . The Mikea Forest , the only place where it is still known to occur , is threatened by human development .

= = Taxonomy = =

During a 2003 biological inventory of the Mikea Forest , a forest region of southwestern Madagascar , a single specimen of the rodent genus Macrotarsomys was collected . This animal turned out to be distinct from both previously known species of the genus ? Macrotarsomys bastardi , which is widespread in western Madagascar , and the larger Macrotarsomys ingens , known only from the Ankarafantsika National Park . Accordingly , Steven Goodman and Voahangy Soarimalala named it in 2005 as a new species , Macrotarsomys petteri . The specific name , petteri , honors French zoologist François Petter for his contributions to the study of Malagasy rodents . M. petteri , the largest species in the genus , is most similar to M. ingens , which may be its closest relative .

= = Description = =

Macrotarsomys petteri is a terrestrial rodent with short forelimbs and long hindfeet . With a head and body length of 150 mm (5 @.@ 9 in) and body mass of 105 g (3 @.@ 7 oz) in the only known complete specimen , it is much larger than M. bastardi , and its measurements fall at or above the upper end of the known range of variation in M. ingens . The upperparts are covered with soft and short , brown fur . Most cover hairs (the main part of the fur) are dark brown for the two @-@ thirds closest to the base , then light brown , with a short dark brown tip . The middle of the back appears darker , because the cover hairs there are entirely dark brown . The hairs are 6 to 8 mm (0 @.@ 2 to 0 @.@ 3 in) long on the shoulders and 7 to 9 mm (0 @.@ 3 to 0 @.@ 4 in) on the back . The guard hairs are gray . Because the flanks lack entirely dark cover hairs , they are slightly lighter than the rest of the upperparts . They are sharply separated in color from the underparts , which are entirely white to buffish . The mystacial vibrissae (whiskers above the mouth) are long , up to 60 mm (2 @.@ 4 in) , and white or black in color . The pinnae (external ears) are dark brown and covered with fine gray hairs , and ear length is 32 mm (1 @.@ 3 in) .

Hindfoot length is 37 mm (1 @.@ 5 in) . The upper sides of the feet are covered with grayish white fur , which extends around the claws to form ungual tufts . On the hindfeet , the fifth digit is relatively short at 6 mm (0 @.@ 2 in) ; the hallux (first digit) is 8 mm (0 @.@ 3 in) long , and the other digits 11 to 12 mm (0 @.@ 4 to 0 @.@ 5 in) . The tail is 238 mm (9 @.@ 4 in) long and naked in part . At the base , it is dark brown both above and below , but slightly lighter below . The upper side remains dark brown for much of its length , though the color does become lighter towards the tip . The lower side becomes mottled at about 55 mm (2 @.@ 2 in) from the tip and then whitish at about 65 mm (2 @.@ 6 in) . Macrotarsomys petteri has a well @-@ developed tuft at its tail tip , consisting of whitish and occasional light brown hairs . This tuft commences at about 130 mm (5 @.@ 1 in) from the base with fairly short hairs and becomes more pronounced at 180 mm (7 @.@ 1 in) . In contrast , M. ingens has a weaker , dark brown tuft .

Macrotarsomys petteri has a large and robust skull with well @-@ developed zygomatic arches (cheekbones) . The interorbital region of the skull (between the eyes) is smooth , as in M. ingens ,

and lacks the shelves characteristic of M. bastardi . The palate is broad and the incisive foramina (openings in the front portion of the palate) are long and broad . In the mandible (lower jaw) , the root of the lower incisor is housed in a distinct capsular process , a protuberance at the back of the jawbone . The lower masseteric ridge (a crest on the outer side of the mandible) is prominent . As is typical of Macrotarsomys , the molars are cuspidate and low @-@ crowned .

= = Distribution and ecology = =

The single known living specimen , a young adult male , was collected at 80 m (260 ft) altitude in the Andaladomo forest (part of the Mikea Forest) . The Andaladomo forest is different in vegetation from the rest of the Mikea Forest , and is similar to forests further to the north on Madagascar . The animal was found in an isolated fragment of dry deciduous forest amid land cleared for maize cultivation . The trap was set at the foot of a tree surrounded by bushes and succulent plants . Other small mammals known from the Mikea Forest include Macrotarsomys bastardi , the introduced black rat (Rattus rattus) , several species of tenrecs , and the shrew Suncus madagascariensis . Although only a single individual of M. petteri was caught during Goodman and Soarimalala 's survey , which accrued 3100 trap @-@ nights , they argue that this does not necessarily mean the species is rare , since trapping rates for rodents in the dry forests of Madagascar are often variable depending on year and season . Nothing is known of its behavior , but the animal 's morphology suggests it lives on the ground .

Subsequent to its discovery at the Mikea Forest , Macrotarsomys petteri was also found as a subfossil in cave deposits at Andrahomana in far southeastern Madagascar , a find reported in 2006 . There , it was found together with more abundant remains of the introduced black rat and house mouse (Mus musculus) , as well as indigenous rodents such as Macrotarsomys bastardi . Two M. petteri bones were radiocarbon dated to 790 ? 410 BCE and 150 ? 390 CE , respectively , a period when the local climate became drier and humans first appeared . Macrotarsomys species are thought to burrow in sandy ground and would not be expected to enter caves ; therefore , the subfossils are probably remains of animals eaten by birds of prey . Although M. petteri could conceivably persist in remnant pockets of wet habitat in southeastern Madagascar , searches at two sites near Andrahomana failed to confirm its presence . It may have become locally extinct in the area because of the drying climate and competition with the black rat .

In 2009 , Macrotarsomys petteri was also recorded from the cave of Ankilitelo in southwestern Madagascar . Remains of a large Macrotarsomys had previously been reported from other southern Madagascar sites , and at least some of these may be M. petteri . A karstic deposit near Lake Tsimanampetsotsa (dated to the Late Pliocene or Early Pleistocene on unclear grounds) contained three species of Macrotarsomys , including a very large one that may well be M. petteri . Remains identified as Macrotarsomys ingens have been reported from a cave at Ankazoabo in southern Madagascar ; these may also be M. petteri .

= = Conservation status = =

The IUCN Red List assesses Macrotarsomys petteri as " Data Deficient " , but notes that the species will very probably qualify as threatened if its current distribution turns out to be restricted to primary forest in the Mikea Forest . The Mikea Forest is one of the largest remaining forests of southwestern Madagascar , but it is not protected and is threatened by logging , pasture , and conversion to agricultural land .