

= *Miniopterus brachytragos* =

Miniopterus brachytragos is a bat in the genus *Miniopterus* that occurs in northern and western Madagascar . Populations of this species have historically been included in *Miniopterus manavi* , but molecular data published in 2008 and 2009 indicate this supposed species in fact consists of five separate species , including the newly described *M. brachytragos* . Up to four species of this group may occur in the same place . *M. brachytragos* has been found in dry and wet forests from sea level to 320 m (1 @, @ 050 ft) altitude .

Miniopterus brachytragos is a small , brown *Miniopterus* ; its forearm length is 35 to 38 mm (1 @. @ 4 to 1 @. @ 5 in) . The hairs of the underparts have buff tips . The short tragus (a projection in the outer ear) is an important distinguishing feature . The uropatagium (tail membrane) is well @-@ furred and the palate is concave .

= = Taxonomy = =

During the 2000s , molecular studies have revealed that the widely distributed African , Eurasian , and Australian genus *Miniopterus* is much more species @-@ rich than previously thought . In a 1995 contribution to Faune de Madagascar on Malagasy bats , Randolph Peterson and colleagues listed four species of *Miniopterus* on Madagascar and the nearby Comoros , including the small *Miniopterus manavi* with a broad distribution on both Madagascar and the Comoros . In 2008 and 2009 , however , Steven Goodman and colleagues presented evidence that the former concept of *M. manavi* in fact encompassed five morphologically and molecularly distinct species of small *Miniopterus* . These included *M. manavi* itself in the Central Highlands , *M. griveaudi* and *M. aelleni* in the Comoros and northern and western Madagascar , *M. mahafaliensis* in southwestern Madagascar , and *M. brachytragos* in northern and western Madagascar . The five recognized species of *M. manavi* @-@ like bats are not each other 's closest relatives , but apparently acquired their similarities through convergent evolution . At some places (for example , Namoroka) four cryptic species of *M. manavi* @-@ like bats , including *M. brachytragos* , may occur together .

Miniopterus brachytragos was described as a new species in the second 2009 paper by Goodman and colleagues . The specific name combines the Ancient Greek *brachys* " short " and *tragos* " goat " and refers to the short tragus (a fleshy projection in the inner side of the outer ear) , one of the main distinguishing features of the species ; the name of this structure derives from the Greek *tragos* . Analysis of sequences of the mitochondrial cytochrome b gene suggested that *M. brachytragos* is most closely related to the clade of *M. manavi* and another Malagasy species , *M. petersoni* . There was some variation within the species ? the most distinctive individual , from the island of Nosy Komba , differed by about 2 @. @ 1 % from other individuals of the same species in its cytochrome b sequence ? but Goodman and colleagues regarded their samples as insufficient for clear conclusions about phylogeographic structure within the species .

= = Description = =

Miniopterus brachytragos is a small , short @-@ tailed *Miniopterus* with short and relatively thin fur . The fur of the upperparts is dark brown and the hairs on the underparts have buff tips . *Miniopterus mahafaliensis* is similar in color , but other small Malagasy *Miniopterus* are darker . The ears are haired above , but virtually naked below and end in a rounded tip . The tragus (a projection on the inner side of the outer ear) is short and has a broad base , sometimes with a crest at the side . It ends in a pointed to slightly rounded tip , which is covered with hairs that are not readily visible to the unaided eye . The short tragus easily distinguishes *M. brachytragos* from other Malagasy *Miniopterus* . The wing membrane is also brown , but the uropatagium (tail membrane) is lighter . The wing membrane and uropatagium are attached to the upper leg at the same level , above the ankle . The uropatagium is relatively densely covered with hairs , particularly on the upper side . *M. manavi* and *M. mahafaliensis* also have a densely haired uropatagium , but in *M. aelleni* and *M. griveaudi* it is only sparsely haired or even mostly naked .

In 28 to 30 specimens measured by Goodman and colleagues , total length was 83 to 92 mm (3 @. @ 3 to 3 @. @ 6 in) , averaging 87 @. @ 4 mm (3 @. @ 44 in) ; tail length was 38 to 43 mm (1 @. @ 5 to 1 @. @ 7 in) , averaging 40 @. @ 2 mm (1 @. @ 58 in) ; hindfoot length was 5 to 6 mm (about 0 @. @ 2 in) , averaging 5 @. @ 8 mm (0 @. @ 23 in) ; tragus length was 3 to 4 mm (0 @. @ 12 to 0 @. @ 16 in) , averaging 3 @. @ 9 mm (0 @. @ 15 in) ; ear length was 9 to 11 mm (about 0 @. @ 4 in) , averaging 10 @. @ 0 mm (0 @. @ 39 in) ; forearm length was 35 to 38 mm (1 @. @ 4 to 1 @. @ 5 in) , averaging 36 @. @ 6 mm (1 @. @ 44 in) ; and body mass was 2 @. @ 9 to 6 @. @ 3 g (0 @. @ 10 to 0 @. @ 22 oz) , averaging 4 @. @ 3 g (0 @. @ 15 oz) . There is no evidence for substantial size differences between males and females .

In the skull , the rostrum (front part) is short relative to other small Malagasy *Miniopterus* and line @-@ shaped . The central groove in the nasal depression is relatively broad and deep . The frontal bones are slightly rounded and bear an indistinct sagittal crest . Further back on the braincase , the lambdoid crest is also poorly developed . The middle part of the palate is concave , not flat as in *M. aelleni* and *M. manavi* . At the palate 's back margin is a short , blunt posterior palatal spine . There are often foramina (openings) in the palate near the last molar . *Miniopterus brachytragos* has 36 teeth in the dental formula 2 @. @ 1 @. @ 2 @. @ 33 @. @ 1 @. @ 3 @. @ 3 (three incisors , one canine , three premolars , and two molars in both upper tooththrows and two incisors , one canine , two premolars , and three molars in the lower tooththrows) . As is characteristic of *Miniopterus* , the first upper premolar (P1) is smaller and more simplified than the second (P2) .

= = Distribution and ecology = =

Miniopterus brachytragos is known from several ecologically different sites . In the Namoroka region , it has been recorded at 100 to 200 m (330 to 660 ft) altitude in dry forest and gallery forest . Another specimen was caught in forest in a karst region in Bemaraha . Near Daraina in the northeast , the species occurs in eastern humid forest mixed with dry forest at 320 m (1 @, @ 050 ft) . At another northeastern site , on the Masoala Peninsula , it was found in lowland gallery forest near sea level . On Nosy Komba , its habitat consists of dry forest mixed with introduced *Mangifera indica* (mango tree) . Little is known of the ecology of *M. brachytragos* , but species of *Miniopterus* generally feed on insects , breed seasonally , and roost in large colonies in caves .