

= *Miniopterus zapfei* =

Miniopterus zapfei is a fossil bat in the genus *Miniopterus* from the middle Miocene of France . First described in 2002 , it is known only from the site of La Grive M , where it occurs with another fossil *Miniopterus* species , the smaller and more common *Miniopterus fossilis* . *M. zapfei* is known from five mandibles (lower jaws) and an isolated fourth upper premolar (P4) . The fourth lower premolar is more slender than in *M. fossilis* and the cingulum shelf surrounding the P4 is less well @-@ developed than in living *Miniopterus* . The length of the first lower molar is 1 @. @ 57 to 1 @. @ 60 mm .

= = Taxonomy = =

Miniopterus zapfei was described by Pierre Mein and Léonard Ginsburg in a 2002 paper on the ages and faunas of the fossil sites of La Grive @-@ Saint @-@ Alban in southeastern France . Mein and Ginsburg wrote that it was the second fossil *Miniopterus* species to be described , after *Miniopterus fossilis* from Slovakia , but did not mention *Miniopterus approximatus* from the Pliocene of Poland or *Miniopterus tao* from the Pleistocene of China . Another fossil species , *Miniopterus rummeli* , was described from the Miocene of Germany in 2003 . The specific name , *zapfei* , honors Helmuth Zapfe , who described *M. fossilis* . *Miniopterus* also includes about 20 living species of small , insectivorous bats distributed in southern Eurasia , Africa , and Australia . Although the genus was historically placed in the family Vespertilionidae , it is now classified in its own family , *Miniopteridae* .

= = Description = =

The known material (hypodigm) of *Miniopterus zapfei* includes a mandible (lower jaw) with the fourth premolar (p4) , first molar (m1) , and second molar (m2) ; a mandible with m1 ; a mandible with m1 and m2 ; a mandible with m2 and the third molar (m3) ; a mandible without any teeth ; and an isolated fourth upper premolar (P4) . Some of the mandibles also preserve the alveoli (openings) for teeth that have not been preserved . The dimensions of the p4 (length and width) are 1 @. @ 03 x 0 @. @ 88 mm ; m1 is 1 @. @ 57 to 1 @. @ 60 x 1 @. @ 01 to 1 @. @ 07 mm ; m2 is 1 @. @ 51 to 1 @. @ 64 x 0 @. @ 95 to 1 @. @ 05 mm ; the single m3 is 1 @. @ 41 mm long ; and the single P4 is 1 @. @ 38 x 1 @. @ 52 mm . In a well @-@ preserved mandible , the length from the alveolus for the first incisor to the end of m3 is 8 @. @ 80 mm and the depth of the mandible at m1 is 1 @. @ 50 mm . *Miniopterus zapfei* can be identified as a *Miniopterus* on the basis of the possession of three lower premolars (designated p2 , p3 , and p4 , because the original first premolar has been lost) ; a two @-@ rooted p3 ; and the nyctalodont molars , with the posterolophid (a crest at the back of the molar) behind the entoconid cusp . *M. zapfei* is about 30 % larger than *M. fossilis* and has a more slender p4 . Compared to living *Miniopterus* , the cingulum (shelf) that surrounds the P4 is less well @-@ developed and the parastyle crest is weaker .

= = Range and ecology = =

Miniopterus zapfei is known only from the site La Grive M in the village of Saint @-@ Alban @-@ de @-@ Roche , department of Isère , southeastern France . La Grive M is one of several fissure filling sites in the area , collectively known as La Grive @-@ Saint @-@ Alban , which have yielded rich fossil faunas . La Grive M is the reference locality for the MN zone MN 7 / 8 , about 13 to 11 million years ago . La Grive M is one of the older sites of La Grive , and Mein and Ginsburg proposed taking it as the reference locality for a separate zone MN 7 . *M. zapfei* is rare in La Grive M ; *Miniopterus fossilis* is much more common in the same site , and has also been found in La Grive L7 and other European localities ranging from MN 6 to MN 13 .