= Miniopterus tao =

Miniopterus tao is a fossil bat in the genus Miniopterus from the Pleistocene of Zhoukoudian in China . It is known from a number of mandibles (lower jaws) , which were initially identified as the living species Miniopterus schreibersii in 1963 before being recognized as a separate species , M. tao , in 1986 . Miniopterus tao is larger than living M. schreibersii and has more closely spaced lower premolars and more robust talonids (back groups of cusps) on the lower molars . The back part of the mandible is relatively low and on it , the coronoid and condyloid processes are about equally high . The average length of the mandible is 12 @.@ 0 mm .

= = Taxonomy = =

In 1934 , Chinese paleontologist C.C. Young was the first to describe fossil bats from the fossil site of Zhoukoudian Locality 1 , which is famous for Peking Man . However , he did not mention Miniopterus , which was first recorded by Kazimierz Kowalski and Chuan @-@ kuei Li in 1963 in a description of new material from layer 8 of the cave site . They identified the Miniopterus as the widespread living species Miniopterus schreibersii on the basis of 48 mandibles (lower jaws) from layer 8 and reassigned another mandible that had previously been identified as Myotis to Miniopterus . In a 1986 paper , however , Bronis?aw Wo?oszyn described the population as a new species , Miniopterus tao , after examining two mandibles in the collections of the Polish Academy of Sciences . He did place the species in the " schreibersii group " of Miniopterus , but considered it unlikely to be ancestral to living M. schreibersii . The specific name , tao , refers to the Chinese philosophical concept , the Tao .

= = Description = =

Wo?oszyn described the species on the basis of two mandibles , one damaged and with the third premolar (p3) through third molar (m3) , and the other intact and with the fourth premolar (p4) through second molar (m2) . Miniopterus tao is a large member of the " schreibersii group " and about as large as Miniopterus rummeli from the Miocene of Germany . The mandible is robust and generally resembles M. schreibersii . The mental foramen (an opening at the outer side of the jaw) is located between the lower canine and second lower premolar (p2) . The coronoid process (a projection at the back of the mandible) is low and rounded and is connected to the condyloid process behind it by a nearly horizontal ridge , which contains a slight raising at its back . Compared to M. schreibersii , the condyloid process is more slender , but the base of the angular process (at the lower back corner of the jaw) is more robust . In M. rummeli , the back part of the mandible is higher and the coronoid process is distinctly higher than the condyloid process .

The preserved alveoli show that p2 is about as large as p3 , not smaller as in the " tristis group " of Miniopterus . The premolars in M. tao are placed closely together , which distinguishes the species from M. schreibersii and fossil European species , including M. rummeli . The p3 is robust and surrounded by a well @-@ developed cingulum (shelf) . The crown is trapezoid in shape . In p4 , there is a clear cingulum at the front and labial (outer) margins . The crown is triangular and the back edge is straight , not saddle @-@ shaped as in M. schreibersii . The molars resemble those of M. schreibersii , but are more robust , particularly the talonids (the cusp groups at the back of the teeth) . The total length of the mandible ranges from 11 @.@ 6 to 12 @.@ 4 mm and averages 12 @.@ 0 mm in ten specimens , the coronoid process is 3 @.@ 1 to 3 @.@ 3 mm high , averaging 3 @.@ 2 mm , and the length of the molar row is 4 @.@ 0 to 4 @.@ 4 mm , averaging 4 @.@ 2 mm .

= = Range = =

Miniopterus tao has only been recorded from Locality 1 at Zhoukoudian ; Locality 3 contains a smaller Miniopterus identified as M. schreibersii . Locality 1 is Pleistocene in age (between about 2

million and 10 @,@ 000 years old) and also contains Ia io and species of Rhinolophus and Myotis among bats , in addition to Homo erectus .