= Juliomys anoblepas =

Juliomys anoblepas is a rodent in the genus Juliomys of the subfamily Sigmodontinae known from a single broken skull . The specimen was collected by Peter Wilhelm Lund in the caves of Lagoa Santa , Minas Gerais , Brazil , in the first half of the 19th century and described by Herluf Winge in 1887 as Calomys anoblepas . The species remained unstudied and its affinities unclear until 2011 , when it was recognized as a member of the genus Juliomys , which includes three other species from southern Brazil and nearby Argentina and Paraguay . J. anoblepas is probably a separate extinct species of the genus , which is no longer found at Lagoa Santa .

Juliomys anoblepas is similar to the other members of its genus in the configuration of its zygomatic plate (a bony plate on the side of the skull) . It hardly extends forward in front of the connection between the plate and the main body of the skull , and that connection is relatively low on the skull . Furthermore , the incisive foramina , openings in the front part of the palate , extend to a point between the first molars , and the palate is short , with its back margin between the third molars . The living species of Juliomys differ from J. anoblepas in various characters , including shorter incisive foramina in two species and the shape of the zygomatic arch (cheekbone) in J. anoblepas . The upper molar row is 4 @.@ 13 mm long , which makes J. anoblepas the largest known species of Juliomys .

= = Taxonomy = =

Between 1835 and 1849 , Danish zoologist Peter Wilhelm Lund collected abundant remains of mammals around the village of Lagoa Santa in Brazil . After his death , his fellow Dane Herluf Winge described Lund 's collections in detail , among many others publishing a monograph about the rodents of the collection in 1887 . Winge described numerous new species , many of which received little attention from systematists afterward , and among these is the species he named Calomys anoblepas . The specific name , anoblepas , derives from the Greek ??? (ano) " upwards " and ????? (blepo) " to look " and thus means " looking upward " . Although Winge did not explain the name , it most likely refers to the zygomatic plate (a bone plate at the side of the skull) , which is bended outward . Winge understood the genus Calomys in a sense very different from that used today , including in it the species Calomys longicaudatus (currently Oligoryzomys nigripes) , Calomys coronatus (currently Euryoryzomys russatus) , Calomys rex (currently Sooretamys angouya) , Calomys laticeps (currently Cerradomys subflavus) , Calomys saltator (currently Hylaeamys laticeps) , and Calomys plebejus (currently Delomys , species uncertain) . He wrote that C. anoblepas was the most divergent of the species of Calomys , but that it was similar to C. longicaudatus .

Winge 's concept of the genus Calomys essentially included unspecialized species with pentalophodont molars , which are characterized by the presence of a crest known as the mesoloph on the upper and mesolophid on the lower molars , and excluded species now placed in Calomys , which he classified in Hesperomys instead . Since 1898 , authors have placed Winge 's Calomys species in Oryzomys , conforming to the more conventional taxonomic arrangement ; after that , the species was referred to as Oryzomys anoblepas . Over many decades , the identity of most of Winge 's species remained uncertain , and in many cases it was not until the 1990s that the original material was restudied to provide a definitive identification of the material . In a 2002 review of the fossil sigmodontine rodents of South America , Argentinean zoologist Ulyses Pardiñas and his coworkers wrote that O. & nsbsp ; anoblepas was " possibly an Oecomys " , but this claim was based only on a cursory investigation .

In 2011 , Pardiñas and Pablo Teta published another paper on " Calomys anoblepas " after re @-@ examining the only known specimen in Copenhagen , and concluded that the animal was instead related to the living genus Juliomys , which currently includes three living species from southern Brazil and nearby Paraguay and Argentina . They recognized some features by which J. anoblepas differs from the living species , and consequently kept it as a distinct , extinct species . Juliomys is a genus of unclear relations within the subfamily Sigmodontinae , which is widespread and very

diverse in South America and southern North America .

= = Description = =

Juliomys anoblepas is known only from the front half of a skull , which was found in a cave known as " Lapa da Serra das Abelhas " . Compared to other species of Juliomys , it is large and has a more robust skull and teeth . Its rostrum (the front part) is broad and short and the interorbital region (between the skull) is hourglass @-@ shaped , with squared margins . The thomasomyine rodent Rhipidomys and the oryzomyine Oecomys , both of which also occur in eastern Brazil , both have a broader interorbital region with better @-@ developed ridges at the margins . One of three living species of Juliomys , Juliomys pictipes , also has a broader interorbital region . Behind the position of the nasals (which are missing in the only known skull) is an interlacrymal depression , a lowered portion of the skull ; the suture (connection) between the two frontal bones is incompletely closed there . This interfrontal fontanelle is shared with Juliomys rimofrons , but not with Juliomys pictipes , nor with most specimens of Juliomys ossitenuis . In Wilfredomys , a Brazilian rodent with some similarities to J. anoblepas , the premaxillary bone forms a narrow projection towards the frontals , which is absent in J. anoblepas and other Juliomys species .

The zygomatic plates are almost completely vertical . As Winge already noted , the front margin of the zygomatic plate hardly extends forward before the antorbital bridge , which connects the plate to the body of the skull . This feature distinguishes J. anoblepas from Wilfredomys and many oryzomyines , but the zygomatic plate of living Juliomys species closely resembles that of J. anoblepas . In addition , the connection between the zygomatic plate and the antorbital bridge is inserted higher on the rostrum in Wilfredomys . The zygomatic arches (cheekbones) spread broadly . More than in other Juliomys species , the front part of the zygomatic arches is bended forward and the zygomatic plates are bended outward . Furthermore , the zygomatic notch , the notch between the zygomatic plate and arch , is deep , not shallow as in J. ossitenuis and J. rimofrons .

The incisive foramina (openings in the palate between the incisors and the molars) are broad and long , extending to the front margins of the first upper molar (M1) . Wilfredomys has even longer incisive foramina , extending between the molars , but the foramina are shorter in J. ossitenuis and J. pictipes . The palate itself is wide and short , with its back margin between the M3s . Oryzomyines like Oecomys and Oligoryzomys have longer palates , extending beyond the third molars . Fine openings (foramina) are present on the palate . The back margin of the palate is squared ; J. anoblepas lacks a spine in the middle of the back margin , as is present in Rhipidomys . Wilfredomys has the back margin U @-@ shaped instead and has a longer palate , with the back margin behind the M3s .

The well @-@ developed upper incisors have orange enamel at their front surfaces and are slightly opisthodont (with their cutting edge behind the vertical plane of the incisors) . The molars are brachyodont (low @-@ crowned) and bear crests and cusps arranged in pairs opposite each other . The front cusp of M1 , the anterocone , is divided into two smaller cusps on each side of the tooth by a valley , the anteromedian flexus . Both M1 and the second molar (M2) have a well @-@ developed mesoloph (a crest near the middle of the tooth) . Although M3 is relatively large , its back part is reduced .

The interorbital region is 4 @.@ 14 mm long and the zygomatic plate is 2 @.@ 38 mm . The diastema (gap) between the incisors and molars is 6 @.@ 39 mm long . The incisive foramina are 5 @.@ 25 mm long and 1 @.@ 77 mm broad . The palatal bridge (the portion of the palate between the incisive foramina and the mesopterygoid fossa behind the back end of the palate) is 4 @.@ 29 mm long and 2 @.@ 75 mm broad at the first molars . The upper molar row is 4 @.@ 13 mm long and M1 is 1 @.@ 19 mm broad . These measurements make J. anoblepas the largest known species of Juliomys .

= = Distribution and habitat = =

Juliomys anoblepas is known only from Lagoa Santa , where the genus no longer occurs ; the nearest records are about 70 km (43 @.@ 5 mi) to the southeast . It is one of several Lagoa Santa fossil rodents that no longer occur in the area . Although the precise environmental background of the Lagoa Santa fossil assemblage remains unclear , they may have been deposited in a period of climatic cooling that led to higher local diversity .