= Pseudoryzomys =

Pseudoryzomys simplex , also known as the Brazilian false rice rat or false oryzomys , is a species of rodent in the family Cricetidae from south @-@ central South America . It is found in lowland palm savanna and thorn scrub habitats . It is a medium @-@ sized species , weighing about 50 grams (1 @.@ 8 oz) , with gray ? brown fur , long and narrow hindfeet , and a tail that is about as long as the head and body . The IUCN has assessed its conservation status as being of least concern , although almost nothing is known of its diet or reproduction .

The only species in the genus Pseudoryzomys , its closest living relatives are the large rats Holochilus and Lundomys , which are semiaquatic , spending much of their time in the water . The three genera share several characters , including specializations towards a semiaquatic lifestyle , such as the presence of membranes between the digits (interdigital webbing) , and a reduction in the complexity of the molar crowns , both of which are at incipient stages in Pseudoryzomys . Together , they form a unique assemblage within the oryzomyine tribe , a very diverse group including over one hundred species , mainly in South America . This tribe is part of the subfamily Sigmodontinae and family Cricetidae , which include many more species , mainly from Eurasia and the Americas . Pseudoryzomys simplex was independently described in 1887 on the basis of subfossil cave specimens from Brazil (as Hesperomys simplex) ; and in 1921 on the basis of a live specimen from Paraguay (as Oryzomys wavrini) . This was confirmed in 1991 that both names pertained to the same species .

= = Taxonomy = =

= = = Discovery and recognition = = =

Pseudoryzomys simplex has had a complex taxonomic history . It was first described in 1887 by Danish zoologist Herluf Winge , who reviewed the materials Peter Wilhem Lund had collected in the caves of Lagoa Santa , Minas Gerais , Brazil . Winge described the species as Hesperomys simplex , and placed it in the same genus (Hesperomys) as the species now called Lundomys molitor and two species now placed in Calomys . Like most other species Winge proposed , H. simplex was mostly ignored in the systematic literature , but from 1952 it was used briefly , in the combination " Oecomys simplex " , for an Oecomys species from central Brazil . In his 1960 review of Oecomys , Field Museum mammalogist Philip Hershkovitz denied any affinities between simplex and Oecomys , noting that various features of the H. simplex skull illustrated by Winge instead suggested affinities to the phyllotine or sigmodont groups .

In 1921 , renowned British mammalogist Oldfield Thomas described Oryzomys wavrini as a new species of Oryzomys from Paraguay . In the next decades , it was viewed as an aberrant species of Oryzomys (then used in a much broader sense than now) , but it was moved to a separate genus , named Pseudoryzomys , by Hershkovitz in 1959 , who noted that although it is similar to Oryzomys palustris in appearance , other features suggest it is more closely related to Phyllotis . Thus , he viewed the animal as a member of the phyllotine group of rodents , which includes Calomys and Phyllotis , not of the oryzomyine group , which includes Oryzomys , and his opinion was mostly accepted in the next few decades . Scientific knowledge of the rare Pseudoryzomys wavrini ? only three specimens were known when Hershkovitz described the genus Pseudoryzomys in 1959 ? increased in the following years , and in 1975 the Bolivian population was named as a separate subspecies , Pseudoryzomys wavrini reigi , because Bolivian animals are slightly larger and darker than those from Paraguay .

In 1980 , Argentinean zoologist Elio Massoia suggested that Winge 's Hesperomys simplex and the living Pseudoryzomys wavrini are in fact the same species . In a 1991 study , American zoologists Voss and Myers confirmed this suggestion after re @-@ examining Winge 's material , finding no appreciable differences among specimens of H. simplex and P. wavrini . Since then , the species has been known as Pseudoryzomys simplex (Winge , 1887) , because simplex is the oldest

specific name for the animal ; Oryzomys wavrini Thomas , 1921 , and Pseudoryzomys wavrini reigi Pine and Wetzel , 1975 , are junior synonyms . Voss and Myers also re @-@ evaluated the relationships of Pseudoryzomys ; they considered it closer to oryzomyines than to phyllotines , but declined to formally place it in Oryzomyini in the absence of explicit phylogenetic justification for such a placement .

= = = Oryzomyine relationships = = =

When Voss and Carleton formally characterized Oryzomyini two years later , they did place Pseudoryzomys in the group , even though it lacks complete mesoloph (id) s . The mesoloph is an accessory crest on the upper molars and the mesolophid is the corresponding structure on the lower molars . Only a few other animals now considered oryzomyines lack complete mesoloph (id) s , but they are absent in various non @-@ oryzomyines , some of which had previously been regarded as close relatives of the oryzomyines that lack them . Oryzomyines with and without complete mesoloph (id) s share various other characters , however , including presence of mammae on the chest , absence of a gall bladder , and some characters of the skull , suggesting that they form one natural , monophyletic group . Oryzomyini is now one of several tribes recognized within the subfamily Sigmodontinae , which encompasses hundreds of species found across South America and into southern North America . Sigmodontinae itself is the largest subfamily of the family Cricetidae , other members of which include voles , lemmings , hamsters , and deermice , all mainly from Eurasia and North America .

Several phylogenetic studies published during the 1990s and 2000s supported a close relationship between Pseudoryzomys and two other oryzomyines with reduced or absent mesoloph (id) s , Lundomys and Holochilus . The extinct genera Noronhomys and Carletonomys , described in 1999 and 2008 respectively , were also recognized as members of the group . In 2006 , a broad morphological and molecular phylogenetic study of Oryzomyini provided further support for the relationship between Holochilus , Lundomys , and Pseudoryzomys . Within this group , morphological data supported a closer relationship between Holochilus and Lundomys to the exclusion of Pseudoryzomys , but DNA sequence data favored a clustering between Holochilus and Pseudoryzomys to the exclusion of Lundomys ; among all oryzomyines , this was the only case where relationships which received strong support from morphological and DNA sequence data conflicted . Together , the three genera form part of a large group of oryzomyines (" clade D ") , which contains tens of other species . Several of those display some adaptations to life in the water , being partially aquatic , as do Pseudoryzomys and its relatives . Morphological data indicate that the genus Oryzomys is the closest relative of the group that includes Pseudoryzomys , but DNA sequence data from the nuclear IRBP gene did not support this relationship ; convergent adaptations towards a semiaquatic lifestyle may explain the morphological support for a relation between Oryzomys and the other three genera .

= = Description = =

Pseudoryzomys simplex is a nondescript , medium @-@ sized rat with long , soft fur . The upperparts are gray ? brown and the underparts are buff ; the color changes gradually over the body . The small ears are covered with short hairs . The tail is as long as or slightly longer than the head and body and is dark above and light below . Despite the presence of short hairs , the scales on the tail are clearly visible . The hairs on the feet are pale . The hindfeet are long and narrow and have five toes , the first and fifth of which are short . Webbing is present between the second , third , and fourth toes , but the membranes are not as large as in Lundomys or Holochilus . The tufts of hair on the toes and several of the pads are reduced , other common characteristics of semiaquatic oryzomyines . The head @-@ body length is 94 to 140 millimeters (3 @.@ 7 to 5 @.@ 5 in) , tail length 102 to 140 mm (4 @.@ 0 to 5 @.@ 5 in) , hindfeet length 27 to 33 mm (1 @.@ 1 to 1 @.@ 3 in) , ear length 13 to 19 mm (0 @.@ 5 to 0 @.@ 7 in) and body mass 45 to 55 g (1 @.@ 6 to 1 @.@ 9 oz) .

The female has four pairs of teats , including one on the chest and three on the belly , and the gall bladder is absent , both important characters of Oryzomyini . As is characteristic of Sigmodontinae , Pseudoryzomys has a complex penis , with the baculum (penis bone) displaying large protuberances at the sides . In the cartilaginous part of the baculum , the central digit is smaller than those at the sides .

= = = Skull = = =

The skull , which is short at the front , shows some typical oryzomyine characters . The palate is long , extending past the molars and the maxillary bones . The alisphenoid strut , which in some sigmodontines separates two foramina (openings) in the skull , is absent . The squamosal bone lacks a suspensory process contacting the tegmen tympani , the roof the tympanic cavity . The front part is short .

The nasal bones end bluntly close to the hindmost extent of the premaxillary bones . The narrow interorbital region , located between the eyes , converges towards the front and is flanked by low beads . The interparietal bone , located in the roof of the skull on the braincase , is nearly as wide as the frontals , but does not reach the squamosals .

The incisive foramina , which perforate the palate between the incisors and the molars , are long and narrow , extending between the first molars . The back margins of the zygomatic plates , the flattened front portions of the zygomatic arches (cheekbones) , are located before the first molars . Like its close relatives Lundomys and Holochilus , Pseudoryzomys has spinous processes on its zygomatic plates . These genera also share relatively simple posterolateral palatal pits , perforations of the palate near the third molar . Unlike Holochilus and Lundomys , however , Pseudoryzomys has a flat palate , lacking a ridge on the middle that extends along the length of the palate . The parapterygoid fossae , which are located behind the third molars , are excavated beyond the level of the palate , but not as deeply as in Holochilus and Lundomys . The mastoid skull bone contains a conspicuous opening , as in most oryzomyines .

The mandible (lower jaw) is short and deep . The mental foramen , an opening at the front of the mandible , just before the first molar , opens to the side . The capsular process of the lower incisor , a raising of the mandibular bone at the back end of the incisor , is well developed . The two masseteric ridges , to which some of the chewing muscles are attached , are entirely separate , joining only at their front edges , which are located below the first molar .

= = = Molars = = =

As in all oryzomyines except Holochilus and its close relatives , the molars are brachyodont , low @-@ crowned , and bunodont , with the cusps extending higher than the central parts of the molars . They are characterized by strong cusps and absence or reduction of accessory crests . The cusps of the upper molars are opposite , but in the lower molars the labial (outer) cusps are slightly further to the front than the lingual (inner) ones . On the upper first molar , one accessory ridge , the anteroloph , is lacking , but another , the mesoloph , is present . Unlike in most other oryzomyines , however , which have mesolophs reaching the labial margin of the molar , the mesolophs of Pseudoryzomys are short and protrude only slightly from the middle of the molar . The corresponding structure in the lower molars , the mesolophid , is completely absent . The hindmost valley between cusps on the lower first molar , the posteroflexid , is severely reduced , foreshadowing its loss in Lundomys and Holochilus . A number of molar traits support Pseudoryzomys 's relationship with Holochilus and Lundomys , forming steps in the transition from the complex , low @-@ crowned generalized oryzomyine molar pattern to the simpler , high @-@ crowned pattern of Holochilus .

As in all oryzomyines , the upper molars all have one root on the inner (lingual) side and two on the outer (labial) side ; in addition , the first upper molar in Pseudoryzomys and some other species has another labial root . The first lower molar has large roots at the front and back of the tooth and two smaller ones in between , at the labial and lingual side . The second and third lowers molars

have two roots at the front , one labial and one lingual , and another at the back .

= = = Postcranial skeleton = = =

Pseudoryzomys has 19 or 20 thoracic (chest) and lumbar vertebrae , 13 of which bear ribs , as is characteristic of oryzomyines . The first ribs contact both the seventh cervical (neck) vertebra and the first thoracic vertebra , an important character of the Sigmodontinae . Unlike in most sigmodontines , including Holochilus and Lundomys , the fourth lumbar vertebra lacks the processes known as anapophyses . There are three or four sacral and about 29 caudal (tail) vertebrae . Between the second and third caudal vertebrae , separate bones called hemal arches are present . These display a spinous process at the back , as in both Holochilus and Lundomys . On the humerus , the upper arm bone , the entepicondylar foramen is absent , as in all members of the Sigmodontinae ; in some other cricetids , it perforates the far (distal) end of the humerus .

= = = Karyotype = = =