

***Sciurillus pusillus* (Rodentia: Sciuridae)**

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Sciurillus pusillus (Rodentia: Sciuridae)

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Abstract: *Sciurillus pusillus* (É. Geoffroy Saint-Hilaire, 1803) is a sciurid commonly called the Neotropical pygmy squirrel. *S. pusillus* is an exceptionally small species of tree squirrel that appears pale gray due to a grizzled pattern of light hair tips on the dorsal pelage. Ranging from Amazonian Peru and Brazil northeast to the Guianas with a patchy distribution, *S. pusillus* is a denizen of the upper canopy of lowland rain forest. This species is listed as “Data Deficient” by the International Union for Conservation of Nature and Natural Resources.

Key words: Brazil, French Guiana, lowland rain forest, Neotropics, Peru, pygmy squirrel, South America, Suriname

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Sciurillus Thomas, 1914

Sciurillus Thomas, 1914a:416. Type species *Sciurus pusillus* Desmarest, 1817, as designated by Thomas (= *Sciurus pusillus* É. Geoffroy Saint-Hilaire, 1803), by monotypy.

CONTEXT AND CONTENT. Order Rodentia, suborder Sciuromorpha, superfamily Sciuroidea, family Sciuridae, subfamily Sciurillinae. *Sciurillus* is monotypic.

Sciurillus pusillus (É. Geoffroy Saint-Hilaire, 1803) Neotropical Pygmy Squirrel

Sciurus pusillus É. Geoffroy Saint-Hilaire, 1803:177. Type locality “Cayenne,” French Guiana.

[*Sciurus*] *guianensis* Goldfuss, 1809:122. Type locality “Cayenne, French Guiana.”

Sc[iurus] pusillus Desmarest, 1817:109. Type locality “from French Guiana;” see “Nomenclatural Notes.”

Sc[iurus] olivascens Olfers, 1818:208. Type locality “Sudamerica.”

Macroxus pusillus Gray, 1867:433. Type locality “Tropical America.”

Macroxus Kuhlii Gray, 1867:433. Type locality “Brazil.”

Sciurus leucotis Gray, 1867:433. Type locality “Brazil.”



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Fig. 1.—An adult (top) and a juvenile (bottom) *Sciurillus pusillus* from the Amazon Research Center in Área de Conservación Regional Tamshiyacu-Tahuayo, Loreto, Peru. Photo by Geoffrey Palmer used with permission.

- Sciurus Kuhlii*: Gray, 1867:433. Name combination.
Microsciurus pusillus Allen, 1914:155. Type locality “Cayenne;” see “Nomenclatural Notes.”
Microsciurus kuhlii Allen, 1914:162. Type locality “Brazil (Castelnaud);” see “Nomenclatural Notes.”
Sciurillus pusillus: Thomas, 1914a:415. First use of current name combination.
Sciurillus pusillus glaucinus Thomas, 1914b:575. Type locality “Great Falls of Demerara River, British Guiana.”
Sciurillus pusillus hoehnei Miranda-Ribeiro, 1941:10. Type locality “Rio Telles Piras (formerly Sao Manoel), northern Mato Grosso,” Brazil.

CONTEXT AND CONTENT. *Sciurillus pusillus* has 3 subspecies (Anthony and Tate 1935; Hershkovitz 1959; Thorington and Hoffmann 2005):

- S. p. glaucinus* (Thomas, 1914b:575). See above (*hoehnei* Miranda-Ribeiro is a synonym).
S. p. kuhlii (Gray, 1867:433). See above.
S. p. pusillus (É. Geoffroy Saint-Hilaire, 1803:177). See above.

NOMENCLATURE NOTES. Buffon (1789) provided a description of a pygmy squirrel from South America and referred to it as “le petit guerlinguet;” his description formed the basis for later authors (Geoffroy Saint-Hilaire 1803; Desmarest 1817) assigning *pusillus* to the genus *Sciurus*. Desmarest is often credited for authorship of *S. pusillus* because of debate over the validity of Geoffroy Saint-Hilaire’s *Catalogue des mammifères du Muséum National d’Histoire Naturelle*; however, *Sciurus pusillus* as named by Geoffroy Saint-Hilaire was declared available by the International Commission on Zoological Nomenclature (2002).

Some authors, such as Allen (1914, 1915) and Nelson (1899), have errantly referred to *S. pusillus* as a member of the genus *Microsciurus*, which contains the dwarf squirrels of the Neotropics. Allen’s review of the *Microsciurus* was based on an analysis of external and cranial measurements, color patterns, geographic descriptions, and dental characters for specimens housed in the British Museum and the American Museum of Natural History. Allen concluded that both *pusillus* and *kuhlii* should be placed in *Microsciurus*. Allen’s assessment was limited by the use of skeletal material of poor quality and perhaps misidentified specimens; as more specimens of higher quality became available *pusillus* was assigned to the genus *Sciurillus* (Thomas 1914a, 1914b; Anthony and Tate 1935).

Local names include mēntsud (pet of the Brazilian tribe Matis), kasu (pet of the Brazilian tribe Marubo), tsadis tsin tsin (Matis), and kapa tuku (Marubo—Dienst and Fleck 2009).

DIAGNOSIS

Sciurillus pusillus is easily distinguished from most other sciurids that occur in its range. *S. pusillus* is the smallest tree squirrel in the Western Hemisphere and the only pale gray squirrel in the Amazon Basin (Emmons and Feer 1997; Eisenberg and Redford 1999). Sympatric species of *Microsciurus* and *Sciurus* have long ears that extend above crown and have contrasting paler underparts (Emmons and Feer 1997). *Sciurus igniventris* (northern Amazon red squirrel) and *Sciurus spadiceus* (southern Amazon red squirrel) are much larger (1,000% larger by mass) and their coloration is bright red with variations of red and brown (Emmons and Feer 1997; Eisenberg and Redford 1999). *S. pusillus* differs from *Sciurus ignitus* (common Bolivian squirrel) in overall size (Bolivian squirrel is larger in mass by 400–500%) as well as coloration, lacking the agouti gray-brown dorsum and the pale orange venter (Emmons and Feer 1997; Eisenberg and Redford 1999). *Microsciurus flaviventer* (Amazon dwarf squirrel) is 50–100% larger in mass and the main difference with *S. pusillus* is its brown coloration (Emmons and Feer 1997).

GENERAL CHARACTERS

Sciurillus pusillus is the smallest tree squirrel in the Western Hemisphere (Fig. 1). Mean (range) of external measurements (mm) of adult *S. pusillus* were: total length, 228 (220–236); length of head and back, 102 (89–115); tail length, 114 (89–145); length of hind foot, 26.5 (24–29); ear length, 12.5 (10–15—Husson 1978; Emmons and Feer 1997; Eisenberg and Redford 1999; Richard-Hansen et al. 1999). Mean (range) mass (g) was 39 (30–48—Husson 1978; Emmons and Feer 1997; Eisenberg and Redford 1999; Richard-Hansen et al. 1999). *S. pusillus* has 7 cervical, 13 thoracic, 6 lumbar, and 3 sacral vertebrae (Thorington and Thorington 1989). Mean lengths of long bones (mm) were: humerus, 20.6; radius, 20.7; femur, 24.0; and tibia, 26.9 (Thorington and Thorington 1989). Mean cranial measurements (mm) from specimens collected in Cayenne, French Guiana, were: skull length, 28.1; condylobasal length, 24.8; basal length, 22.1; palatal length, 11.4; palatilar length, 10.6; length of foramen incisivum, 1.9; length of diastema, 5.5; length of nasals (outer edge), 8.0; greatest breadth of nasals, 4.7; zygomatic breadth, 19.6; width of interorbital constriction, 11.6; breadth of braincase, 15.0; alveolar length of upper cheek teeth, 4.6; and alveolar length of lower cheek teeth combined, 4.3 (Fig. 2; Husson 1978).

DISTRIBUTION

Sciurillus pusillus is found in lowland rain forest of South America. It has a patchy and widely separated

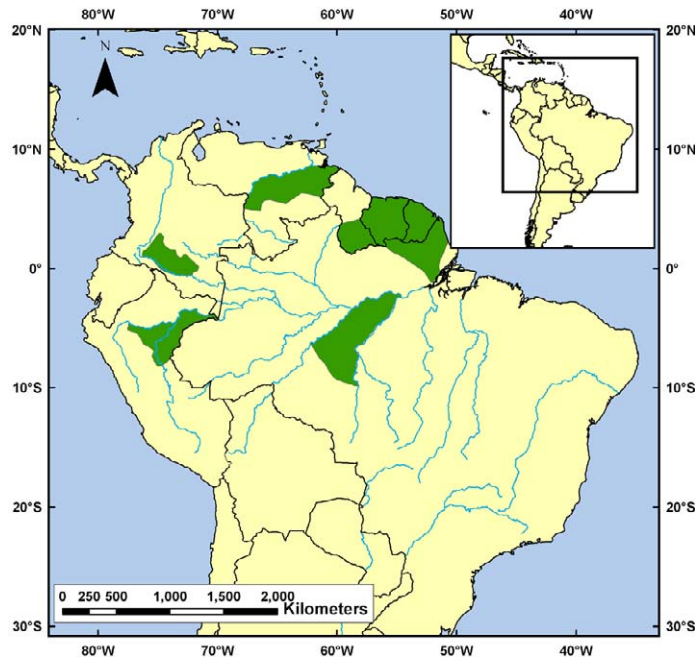


Fig. 2.—Geographic range of *Sciurillus pusillus*. *S. p. pusillus* found in Suriname and French Guiana, *S. p. glaucinus* found in the lower Amazon of Brazil, and *S. p. kuhlii* found in the upper Amazon of Peru

distribution, occurring in Brazil, French Guiana, Peru, and Suriname (Fig. 3; Emmons and Feer 1997; Eisenberg and Redford 1999; Thorington et al. 2012). The distribution of the various subspecies cannot be fully ascertained beyond where type specimens were collected and accurate geographical boundaries that separate each of these subspecies remains unclear (Cabrera 1961).

FOSSIL RECORD

Sciurillus pusillus, and the family Sciuridae in general, lack a fossil record in South America (Simpson 1980). However, it is believed that tree squirrels have been in South America since the Pleistocene epoch (Simpson 1980).

FORM AND FUNCTION

Sciurillus pusillus has a gray dorsum often grizzled, pale gray underparts that do not contrast with the dorsum, and a gray tail (Emmons and Feer 1997; Eisenberg and Redford 1999). The head is slightly reddish and has prominent white patches with white hairs that protrude over the rim of the short ears, which do not extend beyond the crown. The tail is slightly longer than the head and the body. In French Guiana, individuals have more red on their heads compared to other populations (Emmons and Feer 1997) and sometimes have a narrow yellowish white



Fig. 3.—Dorsal, ventral, and lateral views of skull and lateral view of mandible of adult *Sciurillus pusillus* (Field Museum of Natural History: specimen 21789). From Saut Tamanoir, along Mana River, French Guiana.

ring around the eyes (Husson 1978). *S. pusillus* has slender legs and the hind foot has 5 toes. Elongated forelimbs are an adaptation to allow this small mammal to climb large tree trunks (Thorington and Thorington 1989). When climbing upward, forelimbs are laterally abducted, elbows alternate from partial to full extension, hind limbs are flexed at the hip joint and range from partial to full abduction, and the knee joint is semiflexed (Youlatos 2011). When climbing down, the hind limbs are adducted and partially flexed at hip joint, forelimbs are abducted, and elbow is partially extended (Youlatos 2011). Six mammae were counted in a lactating female collected from Igarape Bravo, Brazil (Anthony and Tate 1935). The dental formula for *S. pusillus* is $i\ 1/1, c\ 0/0, p\ 2/1, m\ 3/3$, total 22 (Husson 1978).

ONTOGENY AND REPRODUCTION

Several males chase an estrous female during mating bouts (Emmons and Feer 1997). Pregnant and lactating females have been documented in June with litter size of 1 or 2 (Emmons 1979; Heymann and Knogge 1997).

ECOLOGY

Sciurillus pusillus inhabits mature lowland evergreen rain forests (Emmons and Feer 1997; Eisenberg and Redford 1999). In French Guiana, *S. pusillus* was found mainly in the canopy, and used medium and vertical arboreal substrates (Youlatos 2011). A major food resource is sap and other exudates of large trees that these squirrels frequent, often distinguished by accumulation of bark chips at the base (Emmons and Feer 1997; Heymann and Knogge 1997; Youlatos 1999). In Peru, *S. pusillus* was found nesting in abandoned termite nests attached to large trees, and used fibers of the machimango tree (*Eschweiler*) as nest material (Jessen et al., in press). No fleas were detected in 2 *S. pusillus* after a thorough survey in French Guiana (Beaucournu et al. 1998). Densities do not appear to be high, with 0–3 individuals sighted per kilometer of transect in French Guianan rain forest (de Thoisy et al. 2008). Livetrapping with apples, nuts, or peanut butter for bait yielded extremely poor capture success (< 0.1%) among captures of mammals (Fournier-Chambrillon et al. 2000; Mauffrey and Catzeflis 2003).

BEHAVIOR

Sciurillus pusillus is diurnal. Young siblings will often play with each other and an adult (Emmons and Feer 1997). Solitary individuals or family groups are seen feeding at nearly every layer of the canopy but appear

common around 10 m (Heymann and Knogge 1997). Some groups contain more than 1 adult, especially at a concentrated food source (Emmons and Feer 1997); agonistic chases are common (Heymann and Knogge 1997). In Peru, 6 individuals including adults and young were observed conesting (Jessen et al., in press). Energetic and excitable, adult and juvenile *S. pusillus* quickly dart through the canopy and ascend and descend large trees. In French Guiana, the most frequent locomotor mode of *S. pusillus* was claw-climbing (Youlatos 2011). While foraging and feeding, the tail is extended but not reflected over the body as in many other species of tree squirrels (Emmons and Feer 1997). Guianan squirrels (*Sciurus aestuans*) and dwarf squirrels (*Microsciurus*) often feed in the same trees as *Sciurillus* (Emmons and Feer 1997). The alarm call is given at varying levels of intensity but sounds much like a cricket with a more uncommon trill also heard (Emmons and Feer 1997).

GENETICS

Sciurillus pusillus has no genetic polymorphism across 21 protein loci and average individual heterozygosity was 0.000 calculated from 3 specimens (Hafner et al. 1994). *S. pusillus* constitutes a monotypic lineage that appears to have diverged early in the history of the Sciuridae, and represents a sister group to all other squirrels (Mercer and Roth 2003).

CONSERVATION

The species is rarely hunted (Peres et al. 2003). *Sciurillus pusillus* tolerates forest fragmentation because of its small home range and feeding habits (Dalecky et al. 2002), fire, and hunting at modest levels (Peres et al. 2003). Flooding is a natural seasonal phenomenon in its habitat with which the species copes; however, in extreme cases such as the excessive flooding produced by a hydroelectric dam in French Guiana, 2 *S. pusillus* were rescued out of 1,165 total mammals (Vie 1999). *S. pusillus* is sometimes maintained as a pet (Dienst and Fleck 2009). The International Union for Conservation of Nature and Natural Resources considers the species as “Data Deficient” (Amori et al. 2008). More studies are needed to understand the patchy distribution of this species, as well as the relationship between the 3 different subspecies.

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