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Juliomys rimofrons Oliveira and Bonvicino, 2002 (Rodentia: Cricetidae): Distribution extension

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ABSTRACT: Until now, *Juliomys rimofrons* Oliveira and Bonvicino, 2002 has been known only from the type locality, the county of Itamonte, State of Minas Gerais, Brazil. Based on morphological and karyological examinations, in this study we identified two new records for this species. Both records correspond to individuals collected at Serra da Bocaina National Park, in the states of Rio de Janeiro and São Paulo, Brazil. These records increase the species' geographic range southwards, approximately 100 km from the type locality.

Juliomys, elevated to genus by González (2000), comprises small-sized arboreal rodents with a known occurrence from sea level to high-altitude forested areas from the States of Espírito Santo, Rio de Janeiro and Minas Gerais, in southeastern Brazil, to northeastern Argentina and eastern Paraguay (Costa *et al.* 2007; Olifiers *et al.* 2007; Pavan and Leite 2011). Currently, the genus is composed by three species, namely *Juliomys pictipes* (Osgood, 1933), *J. rimofrons* Oliveira and Bonvicino, 2002 and the most recently described *J. ossitenuis* Costa, Pavan, Leite and Fagundes, 2007. Additionally, the description of a new karyotype for specimens captured in the high-altitude Atlantic Forest of southern Brazil (Paresque *et al.* 2009), possibly correspond to an undescribed species, potentially increasing the number of recognized taxa for the genus.

Some external and skull characters have been described as useful in differentiating the three species, such as overall body size (mainly relevant to discriminate *J. pictipes*, the largest species of the genus), differences in cranium and mandible, dental morphology, and fur color (see Costa *et al.* 2007 for a summarized table of morphological comparisons among species). Karyological information is another effective tool to discriminate species of this genus, since the diploid and autosomal numbers are quite distinct among them (Costa *et al.* 2007).

Juliomys rimofrons is characterized by a long dark brown dorsal pelage, light brown ventral pelage and a markedly bicolored tail (Oliveira and Bonvicino 2002). However, the most useful characters that distinguish this species are (i) the *interfrontal fontanelle*, which according to Oliveira and Bonvicino (2002) can be easily observed, and (ii) the small ectolophid and ectostylid of lower molars m1 and m2 (Costa *et al.* 2007). The karyotype of *J. rimofrons* is characterized by a diploid number (2n) of 20 chromosomes and an autosomal number (AN) of 34, a distinct chromosome complement from *J. pictipes* (2n=36, AN=34) and *J. ossitenuis* (2n=20, AN=36) (Costa *et al.* 2007).

Juliomys rimofrons was described based on three adult specimens collected at the high-altitude forest on Serra da Mantiqueira, county of Itamonte, state of Minas Gerais, Brazil (Oliveira and Bonvicino 2002). In previous studies there is a controversy whether the geographic distribution of this species is restricted to the type locality (Costa *et al.* 2007; Pavan and Leite 2011) or extends into the states of Rio de Janeiro and São Paulo (Bonvicino and Geise 2008). Bonvicino and Geise (2008) suggested that this species also occurs in Serra dos Órgãos National Park (PARNASO), north of the state of Rio de Janeiro, and Bananal Ecological Station (EEB), northeastern of São Paulo state.

In this study we examined external and dental morphology of two individuals identified as *Juliomys* sp.: (1) MN 76263, from São José do Barreiro, State of São Paulo, Brazil (22°50' S, 44°41' W), 1400 m a.s.l., collected in a Sherman® trap by David Bossi during his PhD field work between June 1999 and May 2000; and (2) MN 77793, from Paraty, State of Rio de Janeiro, Brazil (23°12' S, 44°49' W), 785 m a.s.l., captured in May 2011 as part of a Fauna Inventory Program (IBAMA/MMA, process no. 02001.003937/2008-18, authorization no. 93/2011), in a pitfall trap at Serra da Bocaina National Park in southeastern Brazil (Figure 1).

In addition, we analyzed the karyotype of the individual MN 76263, for which an aliquot of liver tissue was collected and fixed in 96% ethanol. The karyotype was done with a two hour bone marrow culture grown in Dulbecco´s MEM with 10% fetal bovine serum, colchicine and ethidium bromide. Conventional stain coloration with Giemsa 5% was used to observe diploid (2n) and autosomal (AN) chromosome numbers and karyological

morphology (Geise, 2010).

External and dental morphological features analyzed in both specimens were compared to those of the holotypes of *J. rimofrons* and *J. ossitenuis*, housed in the Museu Nacional – Universidade Federal do Rio de Janeiro (MN/UFRJ), under numbers MN 61647 and MN 69752, respectively. Additionally, individuals previously identified as *J. rimofrons* from PARNASO (ORB 07-02, 104 and 106) and EEB (EEB 658, 659 and 677) were also analyzed morphologically to confirm species identification.

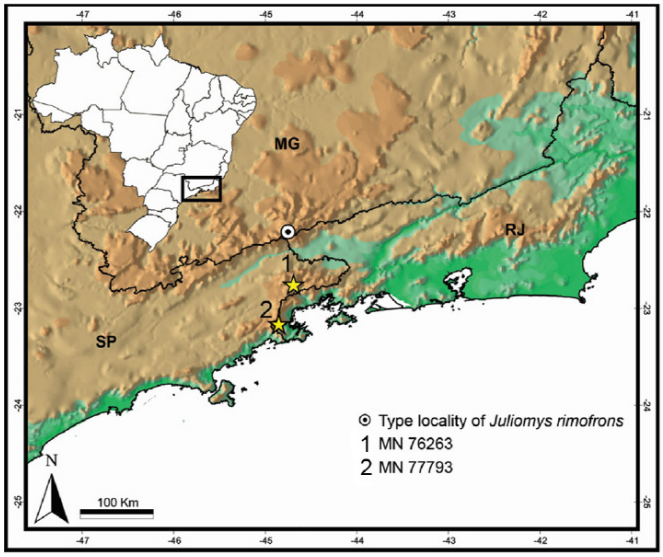

Figure 1. Type locality of *Juliomys rimofrons* (white circle with black dot) and new localities reported in this study (stars). Labeled localities: 1 – São José do Barreiro, São Paulo, Brazil, 22°50' S; 44°41' W (MN 76263); 2 – Paraty, Rio de Janeiro, Brazil, 23°12' S; 44°49' W (MN 77793). MG: Minas Gerais, RJ: Rio de Janeiro, SP: São Paulo.

Based on the absent ectolophid and ectostylid of m1 and m2, we determined that both specimens identified as *Juliomys sp.* correspond to *Juliomys rimofrons* (Figure 2). In addition, the karyotype of MN 76263 had a diploid number of 2n=20 and AN=34, with eight metacentric pairs and one acrocentric pair, confirming such taxonomic identification. The specimens from PARNASO and EEB, previously identified as *J. rimofrons*, correspond instead to *J. pictipes*.

As the specimens of PARNASO and EEB were erroneously identified, these two new records of *Juliomys rimofrons* documented in the present study now truly extend the species' geographic range up to 100 km southwards, to a mountain range in an area covered by Ombrophilous Dense Atlantic Forest in southeast Brazil. This species hereafter should not be considered restricted to the State of Minas Gerais (Costa 2007; Pavan and Leite 2011), but also inhabiting the high-altitude Atlantic Forest of the Serra do Mar massif in southern Rio de Janeiro and northeastern São Paulo states.

Even with these new records, *J. rimofrons* can still be considered as a rare species in zoological surveys (Bonvicino and Geise 2008), probably occurring at low abundances in non-volant small mammal communities and difficult to capture with conventional live-traps, resulting in few collected individuals and absence of data for this species.

Figure 2. (A) Lower left molar row of *Juliomys rimofrons* (MN 77793), with arrows indicating the absence of ectolophid/ectostylid on m1 and m2. (B) Lower right molar row of *Juliomys ossitenuis* (MZUSP 33171), with arrows indicating the presence of ectolophid/ectostylid on m1 and m2; modified from Costa *et al.* (2007).

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