

The oldest available name for the pampas cat of the Uruguayan Savannah ecoregion is *Leopardus fasciatus* (Larrañaga 1923)

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Based on a revision of historical and taxonomic accounts, we showed that *Felis fasciatus* Larrañaga, 1923, represents the oldest available Linnean name referable to the pampas cat endemic to the Uruguayan Savannah ecoregion, currently regarded as *Leopardus munoai* (Ximénez 1961). To anchor the name *Felis fasciatus* to Uruguayan specimens, we designated a neotype for this taxon with *terra typica* in Estancia San Cristóbal, Arroyo Limetas, Conchillas, Department of Colonia, Uruguay. Since Larrañaga's *fasciatus* represents a senior synonym of *L. munoai*, it takes precedence and, in compliance with the International Code of Zoological Nomenclature, it must therefore be used to refer to the "Uruguayan" pampas cat, *L. fasciatus* (Larrañaga 1923), for which we suggested the vernacular name "Larrañaga's pampas cat".

En base a una revisión de compendios históricos y taxonómicos, demostramos que *Felis fasciatus* Larrañaga, 1923, representa el nombre Linneano disponible más antiguo referible a la especie de gato de las pampas endémico de la ecorregión Sabanas Uruguayas, considerado actualmente como *Leopardus munoai* (Ximénez 1961). Para anclar el nombre *Felis fasciatus* a los especímenes de Uruguay, designamos un neotipo para el taxón con *terra typica* en Estancia San Cristóbal, Arroyo Limetas, Conchillas, Department of Colonia, Uruguay. Dado que el *fasciatus* de Larrañaga representa un sinónimo sénior de *L. munoai*, tiene precedencia y, por tanto, en concordancia con el Código Internacional de Nomenclatura Zoológica, debe ser utilizado como el nombre para la especie, *L. fasciatus* (Larrañaga 1923), para el cual sugerimos el nombre común "gato de pajonal de Larrañaga".

Keywords: Campos grasslands; neotype; nomenclature; pampas cat; taxonomy; Uruguay.

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Introduction

The term "pampas cat" has been traditionally used to refer to non-spotted small Neotropical felids of the genus *Leopardus* Gray, 1842, that, unlike their spotted congeners that primarily use forest habitats, occur in open environments across South America ([García-Perea 1994](#); [Nascimento et al. 2020](#)). The systematics of the so-called pampas cat species complex, all forms originally lumped as *Felis colocola* Molina, 1782, has been repeatedly evaluated (e. g., [García-Perea 1994](#); [Johnson et al. 1999](#); [Wozencraft 2005](#); [Barstow and Leslie 2012](#); [Kitchener et al. 2017](#); [Nascimento et al. 2020](#)), yet the taxonomic status and geographical limits of several specific and subspecific designations are not yet fully resolved. Until recently, the most accepted view of the pampas cat taxonomic diversity recognized seven subspecies within a single species, *Leopardus colocola* (Molina 1782). Notwithstanding, a new taxonomic evaluation of the "colocola" species group based on morphological, phylogenetic, and ecological information recognized five different monotypic species of pampas cats ([Nascimento et al. 2020](#)); these are, *L. colocola* (Molina 1782), *L. garleppi* (Matschie 1912), *L. pajeros* (Desmarest 1816), *L. braccatus* (Cope 1889), and *L. munoai* (Ximénez 1961).

Traditionally, the pampas cat from the Campos grasslands of Southeastern South America, *i. e.*, endemic to the Uruguayan Savannah ecoregion ([Tirelli et al. 2021](#); Figure 1), was regarded as a subspecies of *L. colocola* as *L. c. munoai* ([Kitchener et al. 2017](#)). Alternatively, it was treated as a subspecies of *L. braccatus* as *L. b. munoai*, having a much more restricted distribution compared to that of the nomotypical subspecies *L. b. braccatus* (Pantanal cat after [García-Perea 1994](#)), occurring in northeastern Argentina, eastern Paraguay, and deep into central Brazil ([Barstow and Leslie 2012](#)). Recently, [Nascimento et al. \(2020\)](#) elevated *munoai* to the species level using the binomen *Leopardus munoai* (Ximénez 1961) for the first time and referred to as Muñoa's or Uruguayan pampas cat ([Nascimento et al. 2020](#)).

In this contribution, we revised the taxonomic and nomenclatorial history of *L. munoai* (Ximénez 1961). We argue that *munoai* is not the oldest name that is applicable for the Uruguayan pampas cat. Whether the entity of the pampas cat inhabiting the Uruguayan Savannah is regarded as a subspecies or granted full species status, we show that there is an older available epithet (*i. e.*, a senior synonym of *munoai*), which is *Leopardus fasciatus* (Larrañaga 1923). Additionally, we selected a neotype for *L. fasciatus*.

Materials and methods

To reconstruct the nomenclature history of the Uruguayan pampas cat, we conducted an evaluation and reinterpretation of the pertinent literature and assessed the pelage coloration patterns of specimens housed at the Museo Nacional de Historia Natural (MNHN) in Montevideo, Uruguay. We detailed the history of mentions of pampas cats in Uruguay, for which some key regional references needed also to be introduced. We thus provided the necessary background to understand the specifics of the rather complex pampas cat conundrum that we seek to address, with emphasis on the milestones that build up our rationale up to Larrañaga's *fasciatus* and its applicability.

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Results

In the early 19th century, [Azara \(1802\)](#) described the "pajero" cat ("le chat pampa" in the French version; [Azara 1801](#)), mentioning that it occurs in the "Pampas of Buenos Ayres" and "donde al Negro" (the latter in Uruguay as explained in detail below), which constitutes the first published record of pampas cats for the La Plata River basin ([García-Perea 1994](#)). Based on Azara's "pajero", [Desmarest](#) described his *Felis pajeros* Desmarest, 1816 (currently *Leopardus pajeros*), with type locality near Santa Rosa, La Pampa, Argentina, as per the neotype designation by [Nascimento et al. \(2020\)](#).

The first reference to pampas cats in Uruguay thus corresponds to [Azara \(1801, 1802\)](#), whilst the first citation as a binomen for the country was by [Arechavaleta \(1882, 1887\)](#) under *F. pajeros*. Later, [Figueira \(1894\)](#) referenced *F. pajeros* for Uruguay while [Aplin \(1894\)](#) used *F. passerum* Sclater, 1871 instead. In a series of writings originally from the early 1800s albeit published nearly a century later, [Larrañaga \(1923\)](#) coined and described the species *Felis fasciatus* for Uruguayan pampas cats. This binomen remained unaccounted for in the zoological literature for almost 50 more years (e. g., [Devincenzi 1935](#); [Ximénez 1970](#)). Without reference to Larrañaga's *fasciatus*, [Ximénez \(1961\)](#) described a new subspecies of pampas cat under the denomination *Felis colocola munoai* Ximénez, 1961 with type locality in Arroyo Perdido, Department of Soriano, Uruguay (Figure 1). The first mention of *fasciatus* since its formal publication in 1923 was that of [Ximénez et al. \(1972\)](#), where *Felis fasciatus* Larrañaga, 1923 was regarded as a junior synonym of *F. colocola pajeros* Desmarest, 1816. [García-Perea \(1994\)](#) referred to the Uruguayan form of pampas cat as *Lynchailurus braccatus munoai* (i. e., the first mention of the form *braccatus* for the country) occupying the geographical extent that is presently agreed upon for the species now recognized as *Leopardus munoai* ([Nascimento et al. 2020](#); Figure 1). [Klappenbach \(1997\)](#) revalidated Larrañaga's *fasciatus* without a detailed justification. In turn, in our earlier work, we referred to Uruguayan populations as *Lynchailurus braccatus fasciatus* ([González 2001](#); see also [Mones et al.](#)

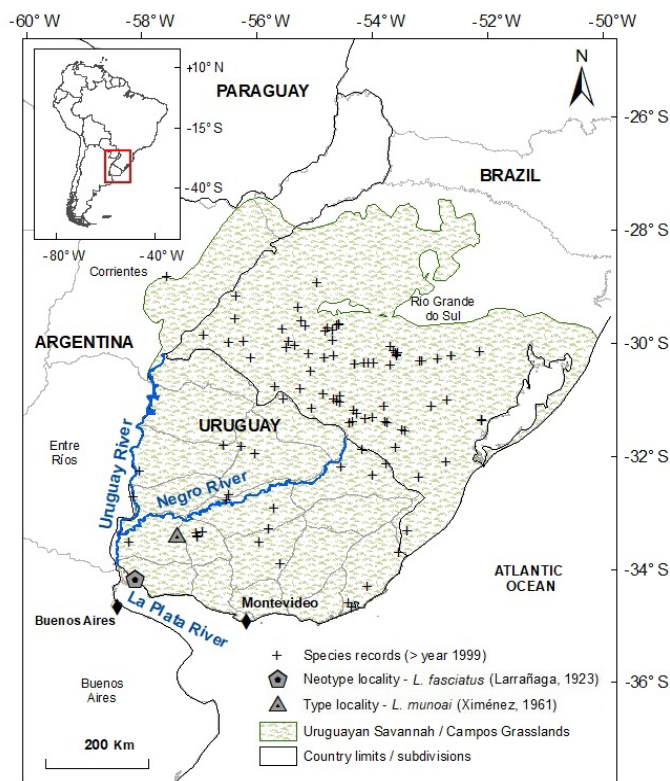


Figure 1. Map of Southeastern South America depicting the main geographical milestones referenced in the text: La Plata and Negro River; neotype locality of *Leopardus fasciatus* (Larrañaga 1923; specimen MNHN 2432 from Estancia San Cristóbal, Arroyo Limetas, Conchillas, Department of Colonia, Uruguay); the Uruguayan Savannah Ecoregion (Olson et al. 2001) where the Larrañaga's pampas is endemic from (Tirelli et al. 2021) [~ Campos sub-region of the Río de la Plata grasslands (Soriano et al. 1992)]; type locality of *L. munoai* (Ximénez 1961, specimen MNHN 884, Arroyo Perdido, Department of Soriano, Uruguay). Only contemporary species' records are shown (i. e., 21st century; Tirelli et al. 2021).

[2003](#)), and alternatively as *Leopardus b. fasciatus* ([González and Martínez-Lanfranco 2010](#)), yet again without due argumentation ([Nascimento et al. 2020:29](#)).

Discussion

Dámaso Antonio Larrañaga (Montevideo, 1771-1848) was a transcendent figure during the Uruguayan independence process. Larrañaga was a presbyterian, architect, writer, and artist, professing a deep interest in the natural sciences; Larrañaga was, in fact, the first Uruguayan naturalist ([Klappenbach 1997](#); [Ramos 2020](#)). His critical eye and attention to detail are well reflected in his writings and scientific illustrations ([Klappenbach 1997](#); [Duarte et al. 2016](#)). Aware of the Linnean binomial system, Larrañaga described and named hundreds of plants and animals ([Klappenbach 1997](#)). Unfortunately, most of his work remained unpublished until almost 75 years after his death. Between 1922 and 1924, his writings were edited and finally published as a collection of three volumes in the "Anales del Instituto Histórico y Geográfico" of Uruguay. For this reason, several of Larrañaga's pioneer observations and taxonomic descriptions remained in the dark, for the most part, up to this day. One of such neglected taxonomic epithets is *Felis fasciatus* Larrañaga, 1923. Below, in agreement with

Clappenbach (1997) and justifying its earlier usage (e. g., González and Martínez-Lanfranco 2010), we argue for the recognition of *Felis fasciatus* Larrañaga, 1923 as the oldest name applicable to the Uruguayan pampas cat.

Félix de Azara (1746–1821) was a prominent naturalist and cartographer tasked with the mapping of the territorial limits of the Spanish and Portuguese empires, with extensive explorations across the La Plata River basin in Asunción (Paraguay), Buenos Aires (Argentina), and "Banda Oriental" (Uruguay; Ballarín et al. 2006). In the Spanish version of his work, Azara (1802:160) wrote "NÚM. XVIII. DEL PAJERO. Le llaman Gato pajero, porque habita los campos, escondiéndose en los pajonales; sin entrar en los bosques y matorrales... Yo pillé quatro en las Pampas de Buenos Ayres entre los 35 y los 36 grados y otros tres donde al Negro...", and continued (Azara 1802:161) "El encontrarse en ambas bandas del Río de la Plata, con identidad de formas, colores y costumbres..."; lastly, he added (Azara 1802:161) "La muneca hasta las unas, y lo mismo en el pie, es acanelada clara sin listas". Our translation of Azara's fragments above is as follows: "NUM. XVIII. FROM THE PAJERO. It is called 'Gato pajero', because it inhabits the fields, hiding in the tall grasses; without entering forests and bushes... I caught four in the Pampas of Buenos Ayres between the 35 and 36 degrees and other three where the Negro... As it is found on both sides of the La Plata River, with identity of forms, colors and costumes... The wrists up until the nails, same as in the foot, is light cinnamon without bands".

Referring to Azara's XVIII "pajero" from the Spanish version [Azara 1802; the roman number "XVIII" does not appear in the French version (Azara 1801)], Larrañaga (1923:345), described *Felis fasciatus* in Latin as follows: "Sp. 5.a. *F. fasciatus-cauda elongata immaculata, lanosa, corpore supra dilute fusco, infra albido cum pedibus cinnamomo-fasciato*. Sp. n. HABITAT communior precedenti, nemora con ingreditur: longitudo 34^{1/3}, cauda 11^{3/4}. Azara N.º XVIII Pajero". Our translation in English is as follows: "Sp. 5.a. *F. fasciatus*-elongated tail, spotless, woolly, body pale brown above, whitish below with cinnamon-banded feet. Sp. n. HABITAT More common than the previous one, it enters forests: longitude 34^{1/3}, tail 11^{3/4}. Azara N.º XVIII Pajero".

Albeit Ximénez (1961) did not cite Larrañaga's *fasciatus* upon describing *munoi*, later Ximénez et al. (1972:18) referred to *fasciatus* as a junior synonym of *Felis pajeros* only noting that Larrañaga reproduced the external measurements from Azara (1802), argument followed by Nascimento et al. (2020). However, as we argue below, the assumption that Larrañaga's *fasciatus* merely described the "pajero" or "chat pampa" of Azara (1801, 1802) is mistaken.

Firstly, since Azara (1802) referred that the "pajero" occurred on both sides of the La Plata River, it follows that "donde al Negro" corresponds to the Negro River, with headwaters in Southern Brazil, crossing Uruguay east to west, finding its mouth in the Uruguay River (Figure 1). To strengthen the likelihood of this assertion, there is extensive evidence that Azara undertook his explorations and

spent long periods in what is now Uruguay (González 1943; Mones and Clappenbach 1997; Contreras and Teta 2003; Ballarín et al. 2006). Thus, Azara's "pajero" encompasses populations that are now considered to belong to two different species (one in Argentina to the west of the Uruguay River, in Buenos Aires, and the other east of the Uruguay River in what is now Uruguay; Ximénez 1961; Nascimento et al. 2020). Larrañaga (1923), in turn, was explicit in that the taxa he was enumerating and describing, e. g., *Felis fasciatus*, were from Uruguay and not generically from the Río de la Plata (which could have also included Argentina; Larrañaga 1923:341–342). Secondly, Azara did not explicitly mention which specimens the dimensions that he reported were taken from. Hence, the argument used by Ximénez et al. (1972:18) regarding *fasciatus* as a synonym of *pajeros* based on those measurements is unsubstantiated, most especially detached from the whole of Larrañaga's diagnosis of *fasciatus*. Thirdly, while Azara mentioned that the "pajero" avoided forested areas, Larrañaga pointed out that *fasciatus* used wooded areas as well, in clear contrast to the former. Fourth, a key trait that Larrañaga noted in his diagnosis is represented by his chosen specific epithet, i. e., *fasciatus*. In Latin, the word "fasciate" is an adjective referring to bands or stripes (e. g., broadly banded with color, see <https://www.merriam-webster.com/dictionary/fasciate>). Thus, "fasciatus" describes an object displaying a banded or striped pattern that, in the context of Larrañaga's diagnosis of the new species, *fasciatus* refers to the specimens as having cinnamon-colored banded feet. Azara (1802:162), in contrast, mentioned that the "pajero" had lightly cinnamon-colored limbs without bands. Fifth, while describing *munoi*, Ximénez (1961:6) noted that Uruguayan specimens displayed more vivid, rufous colorations (he used the Spanish word "anaranjado," meaning orangy in English); this difference in coloration is captured too in Larrañaga's description of *fasciatus* by using "cinnamon" versus Azara's "light cinnamon." Furthermore, whereas *munoi* specimens have



Figure 2. Ventral views of sample skins of *Leopardus fasciatus* (Larrañaga 1923) showing the variation from dark to lighter-colored talons, left to right, for Uruguayan specimens MNHN 1315, MNHN 2780, MNHN 2432 (designated neotype), and MNHN 4706, respectively.

been traditionally described as showing bicolored feet (*i. e.*, talons black versus paler dorsal side), our revision of Uruguayan specimens showed a great degree of variation in this trait (Figure 2). Notwithstanding, whereas it is worth mentioning for completeness, the fact that Larrañaga did not refer to this trait in his description is beyond the point. What stands out is that, despite Larrañaga's succinct description of *fasciatus*, the naturalist clearly distinguished between Azara's "pajero" (*i. e.*, *F. pajeros* Desmarest, 1816) from the specimens he used for describing his *fasciatus* for Uruguay. In sum, Larrañaga made undoubtful morphologic and geographic observations that best fit the description and distribution of *L. munoai* and not that of *L. pajeros*. This is contrary to what has been supported elsewhere (*e. g.*, [Ximénez et al. 1972](#); [Nascimento et al. 2020](#)), yet our argumentation is void of speculative claims based on partial and subjective interpretations of Larrañaga's description of *F. fasciatus*.



Figure 3. Dorsal and ventral views of the skin of the neotype specimen (MNHN 2432) of *Leopardus fasciatus* (Larrañaga 1923), female, collected in 1971 at Estancia San Cristóbal, Arroyo Limetas, Conchillas, Department of Colonia, Uruguay.

[Larrañaga \(1923\)](#) did not specify a type locality nor selected a holotype for the new species. This was a common practice at the time, and it was the same situation for other original descriptions within the "pampas cat" complex ([García-Perea 1994](#)). Henceforth, to anchor Larrañaga's *fasciatus* to Uruguayan pampas cats, here we designate specimen MNHN 2432 as the neotype of *L. fasciatus* (Larrañaga 1923); (Figure 3, 4). Then, the type locality of *L. fasciatus* is Estancia San Cristóbal, Arroyo Limetas, Conchillas, Department of Colonia, Uruguay ($-34^{\circ} 9' 54''$ S, $-58^{\circ} 5' 49''$ W; Figure 1). Provided this, together with the fact that there is no evidence suggesting that more than one species of pampas cat inhabits Uruguay (*e. g.*, [Nascimento et al. 2020](#)), we formally restrict the name *fasciatus* to pampas cat populations occurring in Uruguay, southern Brazil in the state of Rio Grande do Sul, and a portion of Corrientes province in eastern Argentina; note that this range includes the three specimens referenced by Azara from "donde al Negro" in Uruguay ([Nascimento et al. 2020](#); [Tirelli et al. 2021](#)).

In sum, *Felis fasciatus* Larrañaga, 1923 represents the oldest available Linnean name for the Uruguayan pampas cat (see also [Klappenbach 1997](#)), an endemic species of the Uruguayan Savannah ecoregion ([Tirelli et al. 2021](#)). Accordingly, in compliance with the Principle of Priority of the International Code of Zoological Nomenclature ([ICZN](#)



Figure 4. Views of the skull (dorsal, ventral, and lateral including mandibles) of the neotype specimen (MNHN 2432) of *Leopardus fasciatus* (Larrañaga 1923), a female collected in 1971 at Estancia San Cristóbal, Arroyo Limetas, Conchillas, Department of Colonia, Uruguay.

1999), we formally suggest that Larrañaga's *fasciatus* is the name that applies for the "Uruguayan" pampas cat. Given the current understanding of pampas cat's taxonomic diversity (e. g., Nascimento et al. 2020), it should be used in the binomial combination *Leopardus fasciatus* (Larrañaga 1923). For an amended diagnosis of this species see Nascimento et al. (2020). As a corollary of our taxonomic proposition, we regard *L. munoai* (Ximénez 1961) as a junior synonym of *L. fasciatus*. Lastly, we suggest the use of the following vernacular names for *L. fasciatus* (Larrañaga 1923): Larrañaga's pampas cat (English); gato de pajonal de Larrañaga (Spanish); gato palheiro de Larrañaga (Portuguese).

There are still many unknowns about "What is a pampas cat?" (Giordano 2013). This work clarified the oldest available name for an entity readily threatened with extinction (Tirelli et al. 2021). Despite the clarity that we achieved about the identity of the Larrañaga's pampas cat, the likelihood of its long-term survival remains far from certain.

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