

# Geographic distribution extension of *Anoura cadenai* and comments on *Sturnira giannae* distribution in Colombia

## Extensión de la distribución de *Anoura cadenai* y comentarios sobre la distribución de *Sturnira giannae* en Colombia

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Although Colombia holds a high richness of Chiroptera, many taxa and geographic areas remain unexplored. In this study, we confirm the presence of *Anoura cadenai* and *Sturnira giannae* in new geographical regions and update the information about its distribution in the country. Through the review of field-collected individuals and specimens deposited in the Mammal Collection of the C. J. Marinkelle Natural History Museum (ANDES-M), we evaluated the concordance and variations of several external and craniodental traits with respect to the original descriptions. The records of *A. cadenai* on the eastern mountain range showed a distributional extension from the western and central mountain ranges. *Sturnira giannae* is widely distributed along the eastern mountain range, the inter-Andean valley of the Magdalena River, and the western mountain range's western slope. Unlike the original descriptions of both bat species, we found our specimens had smaller external and craniodental sizes. This is the first report of *Anoura cadenai* in the Eastern Mountain Range and in sympatry with *A. latidens*. Regarding *S. giannae*, we report its occurrence in the inter-Andean valley of the Magdalena River and reaching the western slope of the Western Mountain Range. This broadens the previously suggested distribution up to the eastern slopes of the Andes. More extensive specimen reviews in biological collections could provide new information about the distribution of these species in Colombia.

**Key words:** Glossophaginae; leaf-nosed bats; Phyllostomidae; Sturnirini.

Aunque Colombia alberga una gran riqueza de especies de murciélagos, muchos taxa y áreas geográficas permanecen poco exploradas. En este trabajo confirmamos la presencia de *Anoura cadenai* y *Sturnira giannae* en nuevas regiones geográficas y actualizamos la información sobre su distribución en el país. A partir de la revisión de individuos recolectados en campo y de especímenes depositados en la Colección de Mamíferos del Museo de Historia Natural C. J. Marinkelle (ANDES-M), evaluamos la concordancia y la variación de caracteres externos y craneodentales con respecto a las descripciones originales. Los registros de *A. cadenai* en la cordillera oriental constituyen una extensión de distribución desde las Cordillera Occidental y Central. *Sturnira giannae*, es una especie con amplia distribución en Colombia a lo largo de la Cordillera Oriental, el valle del río Magdalena, y sobre la vertiente occidental de la Cordillera Occidental. En comparación con las descripciones originales de ambas especies, encontramos variaciones morfológicas que comprenden menores tamaños en rasgos externos y craneodentales. Este es el primer reporte de *A. cadenai* en la Cordillera Oriental y en simpatria con *A. latidens*. En cuanto a *S. giannae*, reportamos su ocurrencia en el valle del río Magdalena y hasta la vertiente occidental de la Cordillera Occidental, lo que amplía el rango de distribución previamente sugerido hasta la vertiente oriental de los Andes. Revisiones más extensas en colecciones biológicas podrían aportar nueva información acerca de la distribución de estas especies en Colombia.

**Palabras clave:** Glossophaginae; murciélagos de hoja nasal; Phyllostomidae; Sturnirini.

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*Anoura cadenai* Mantilla-Meluk and Baker 2006 is a nectarivorous bat species endemic to Colombia. It was described from an adult male collected near the Rio Bravo at 1,000 m in the department of Valle del Cauca, Colombia. At the type locality, *A. cadenai* is sympatric with *A. caudifer*, and *A. cultrata*, but can be distinguished by some characteristics: the larger size, and upper canines with a longitudinal sulcus

of *A. cadenai* compared with *A. caudifer*, while is considerably smaller, with a less robust skull, and smaller upper canines compared with *A. cultrata* (Mantilla-Meluk and Baker 2006).

While *A. cadenai* was thought to occur along the western slope of the southwestern Colombian Andes in an altitudinal range between 800 and 1,400 m (Mantilla-Meluk

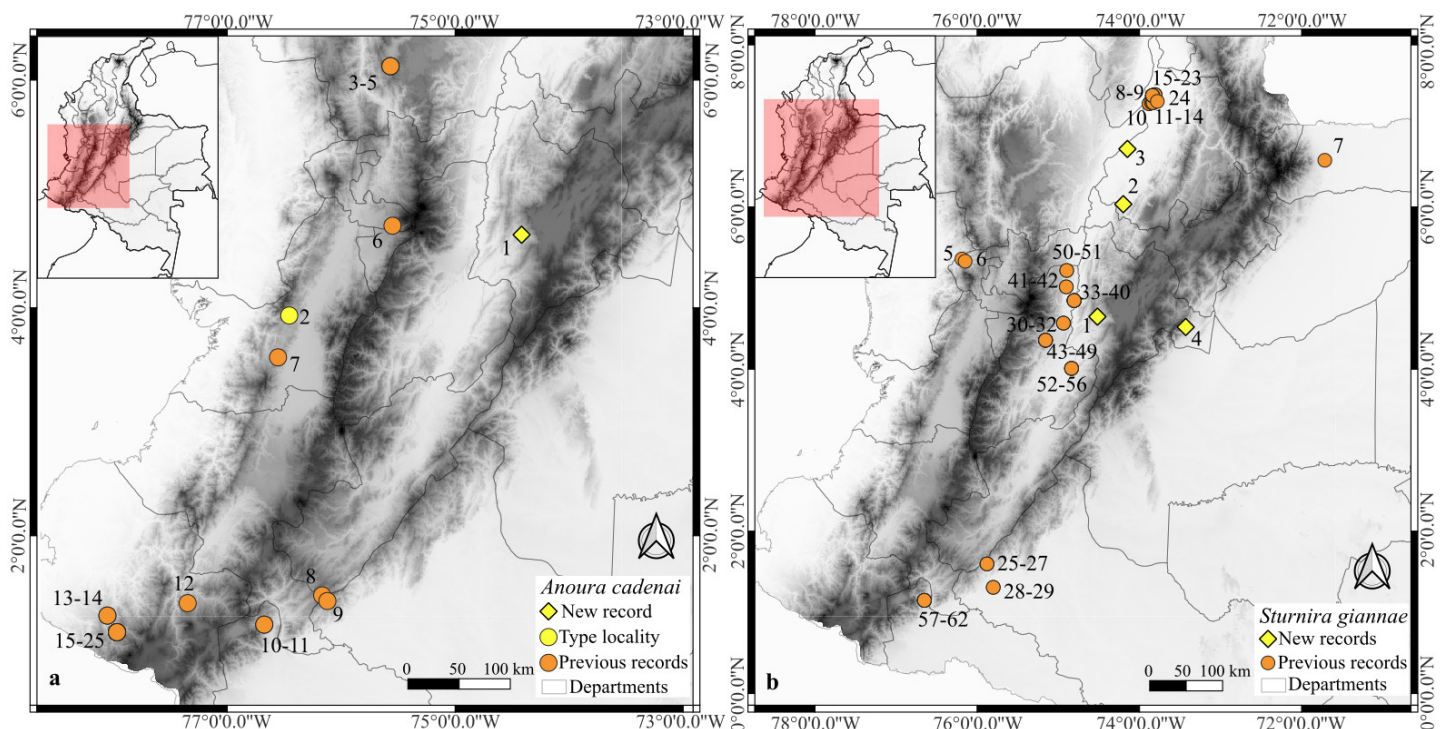
and Baker 2006), other specimens have been reported from Nariño, Putumayo, Huila, and the central mountain range in Risaralda and Antioquia, which corresponds to its northernmost record (Figure 1a; Mantilla-Meluk and Baker 2006; Calderón Leytón et al. 2021; Pérez Torres et al. 2021; Rodríguez-Bolaños and Solórzano 2021; Ruano Meneses et al. 2021; Rueda Isaza et al. 2022).

*Sturnira giannae* Velazco and Patterson 2019 is mostly a frugivorous bat species from the humid forests of Amazonia and the lowlands of the Orinoquia region, occupying a wide variety of forests, including primary and secondary forests below 2,000 m (Burneo 2021). The species was described from an adult male collected near Sinnamary, Cayenne, French Guiana, at 210 m, and can be distinguished from other sympatric species (*S. magna*, *S. oporaphilum*, *S. sorianoi*, and *S. tildae*) from its external and craniodental characteristics. Some of these are: all overlap somewhat in size but are distinguished by pelage and craniodental characteristics (Tables 15 and 17 in Velazco and Patterson 2019); the dorsal fur between the shoulders of *S. giannae* is short (5.0–6.0 mm) whereas it is long (> 8 mm) in *S. magna*, *S. sorianoi*, *S. oporaphilum*, and *S. tildae*; dorsal hairs are bicolored in *S. giannae* whereas they are 4-colored in *S. magna*, *S. sorianoi*, *S. oporaphilum*, and *S. tildae*; ventrally the hairs are short (3–5 mm) and monocolored in *S. giannae* and *S. tildae*, whereas they are long (6–8 mm) and tricolored in *S. sorianoi*, and *S. oporaphilum*, and short (3–5 mm) and 4-colored in *S. magna*; the ventral fur is pale brown to reddish brown in *S. giannae*, whereas is pale brown in *S. magna*, *S. sorianoi*, *S. oporaphilum*, and *S. tildae*; the metaconids and entoconids of m1 and m2 are well defined and separated by a deep

notch in *S. giannae*, whereas they are well defined but separated by a shallow notch in *S. tildae*, and poorly defined and not separated by a notch in *S. magna*, *S. oporaphilum*, and *S. sorianoi*; the anterior process of the glenoid fossa is well developed in *S. giannae* and *S. magna*, whereas it is weakly developed in *S. sorianoi*, and *S. tildae* (some specimens of *S. oporaphilum* lack the anterior process of the glenoid fossa while in others it is weakly developed); the I1 is slender in *S. giannae*, and broad in *S. oporaphilum*, *S. sorianoi*, *S. tildae*, and *S. magna* (Velazco and Patterson 2019).

Although the *S. giannae* description mentioned its distribution range from “eastern slopes of the Andes and adjacent Amazonian lowlands from Colombia to northern Bolivia”, it did not include Colombian records (Velazco and Patterson 2019). However, several specimens have been recorded from Arauca, Caquetá, Putumayo, Risaralda, Santander, and Tolima (Figure 1b; Morales Martinez and Díaz 2020; García-Herrera et al. 2021; Niño Reyes and Corral Gómez 2022; Ramírez-Chaves et al. 2022). In this note, we update the distribution of the bat species *A. cadenai* and *S. giannae* in Colombia and compare morphological characters to earlier descriptions.

Field sampling was conducted out in 2019 in the Municipality of La Mesa, Cundinamarca, during a study about vector-borne and zoonotic diseases (Carrasquilla et al. 2023). We used 3 mist nets (12 m x 3 m) for 5 nights from 18:00 hr to midnight. We captured 1 adult female of *A. cadenai* on 31 July (4° 38' 33.36" N, 74° 27' 0.72" W, 1,271 m; Figure 1a; Appendix 1), and 1 adult male of *S. giannae* on 20 May (4° 38' 54.20" N, 74° 31' 10.67" W, 637 m; Figure 1b; Appendix 2). The individuals were collected following the proce-



**Figure 1.** Distribution of a) *Anoura cadenai* and b) *Sturnira giannae* in Colombia. The numbers correspond to the localities (see Appendix 1). For *A. cadenai*: 1) La Mesa (Cundinamarca), on the western slope of the eastern mountain range; and for *S. giannae*: 1) La Mesa (Cundinamarca), on the western slope of the eastern mountain range; 2) Bolívar (Santander), 3) Cimitarra (Santander) from the middle Magdalena valley; and 4) Medina (Cundinamarca), on the eastern slope of the eastern mountain range.

ture described by [Carrasquilla et al. \(2023\)](#), prepared as dry skin and skull removed and deposited in the Mammal Collection of the C. J. Marinkelle Natural History Museum of the Universidad de los Andes (ANDES-M). The research project was approved by the Ethics Committee from Universidad de los Andes No. 839–2018, the Institutional Animal Care and Use Committee from Universidad de los Andes CICUAL (FUA 18–006), and the National Environmental Licensing Authority of Colombia (ANLA; Permits No. P06249S3811\_N0001, P06249S4071\_N0002).

We found 3 additional specimens of *S. giannae* in the ANDES-M collection, 1 adult female from Cundinamarca, recently cataloged as *Sturnira* sp., preserved in dry skin and with the skull removed (ANDES-M 2703), and 2 for-

merly identified as *S. liliium*: 1 adult male from Santander, dry skin and skull removed (ANDES-M 1869), and 1 adult female from Santander, preserved in alcohol with the skull removed (ANDES-M 2429; Appendix 2).

All specimens were identified based on the cranial, dental, and external morphological diagnostic characters following [Mantilla-Meluk and Baker \(2006\)](#), [Gardner \(2007\)](#), [Velazco and Patterson \(2019\)](#), and [Díaz et al. \(2021\)](#). Lineal measurements were taken directly from the specimens (Table 2). External and craniodental measurements were taken using a caliper (to the nearest 0.05 mm) following [Mantilla-Meluk and Baker \(2006\)](#) for *A. cadenai*, and [Velazco and Paterson \(2019\)](#) for *S. giannae*. The lineal measurements are listed in Tables 1 and 2. To evaluate the concor-

**Table 1.** Measurements of the specimen collected in La Mesa, Cundinamarca, compared to the type series of *Anoura cadenai* deposited in the Instituto de Ciencias Naturales (ICN) of the Universidad Nacional de Colombia, Bogotá. \*Data were taken from [Mantilla-Meluk and Baker \(2006\)](#).

	Holotype ICN 9152 ♂	Paratype ICN 9151 ♂	Paratype ICN 9153 ♂	Paratype ICN 9154 ♂	Mean measurements of the type series*	Mean measurements by <a href="#">Calderón-Acevedo and Muchhala (2018)</a>	ANDES-M 2591 ♀
<b>External measurements</b>							
Total length	59	60	60	61	60	-	55.2
Tail length	0	0	0	0	0	-	0
Hind foot length	11	10	10	10	10	-	9.5
Ear length	12	14	12	10	12	-	9.6
Forearm length	36.85	36.97	36.7	36.12	36.66	36.81	36.5
Tibia length	12.04	12.43	11.28	10.19	11.49	11.77	12.1
<b>Third digit</b>							
Metacarpal length	36.46	36.99	36.05	36.46	36.49	36.1	34.6
Length first phalanx	12.37	12.11	12.1	12.58	12.29	12.86	12.5
<b>Fourth digit</b>							
Metacarpal length	35.01	32.83	35	34.14	34.25	34.14	33.5
Length first phalanx	8.45	9.66	8.48	8.57	8.79	8.9	9
<b>Fifth digit</b>							
Metacarpal length	30.41	29.91	30.07	29.29	29.92	29.71	29.2
Length first phalanx	7.96	7.98	8.2	7.46	7.9	7.8	7.1
Calcar length	4.9	4.22	4.33	5.33	4.70	-	3.8
<b>Craniodental measurements</b>							
Greatest skull length	23.8	23.4	23.1	23.2	23.4	23.06	21.9
Cranium height	8	8	8	8	8	7.23	8.3
Palatal length	12	13	12	12	12	12.01	11.2
Rostrum width	4	5	4	4	4	-	3.9
Post-orbital width	4.53	4.46	4.57	4.58	4.53	4.59	4.4
Zygomatic width	9.71	10.4	10.27	-	10.13	-	9.3
Cranium width	8.66	8.5	8.4	8.82	8.96	9.06	8.7
Mastoid width	9.69	9.76	9.34	9.66	9.61	9.53	9.3
Upper canine-canine distance	4.27	4.44	4.21	4.33	4.31	4.24	4.1
Mandible tooth row length	ND	7.78	7.87	8.52	8.05	9.06	8.6
Mandible length	16.9	17.7	17.1	16.4	17	16.87	16.5
Mandible height	3.9	4.12	4.48	4.2	4.18	-	3.8

dance of our specimens' measurements with the original descriptions, we have considered that a deviation of more than 1 mm with respect to the average of the type series is a different value. Finally, to map the species occurrences in Colombia, we accessed previous records of preserved specimens of *A. cadenai* and *S. giannae* in Colombia through the Global Biodiversity Information Facility (Calderón Leytón et al. 2021; Pérez Torres et al. 2021; Rodríguez-Bolaños and Solórzano 2021; Ruano Meneses et al. 2021; Niño Reyes and Corral Gómez 2022; Ramírez-Chaves et al. 2022; Rueda Isaza et al. 2022).

*Anoura cadenai* Mantilla-Meluk and Baker 2006: specimen ANDES-M 2591 was captured and collected along with individuals of the species *Anoura latidens* Handley 1984, *Artibeus lituratus* (Olfers 1818), *Carollia castanea* Allen 1890, *Carollia perspicillata* (Linnaeus 1758), and *Glossophaga soricina* (Pallas 1766). The specimen is an adult female with the craniodental and external morphological characters reported by Mantilla-Meluk and Baker (2006): a) coloration blackish brown-3 and black throughout the body; b) individual dorsal hairs pale grayish on basal two thirds, brown tips; c) those hairs of underparts black to base; d) pelage short and crisp; e) interfemoral membrane narrow with some hairs and external tail non visible; f) braincase tapered anteriorly with broad and heavy rostrum and zygomatic complete but slender (broken in most specimens); g) braincase raising smoothly; h) broad and rounded occipital region; i) outer upper incisor enlarged; j) upper canine enlarged and projected, roughly triangular in cross-section at the base, with distinct anterointernal, anteroexternal, and posterior basal cusps; and k) internal face anteropos-

teriorly concave, and anterior face flat, with a longitudinal sulcus from the base of the crown to near tip that resembles the sulcus of canines of *A. cultrata* but less prominent.

The external and craniodental measurements match with those reported for the type series by Mantilla-Meluk and Baker (2006) and with mean values for the species by Calderón-Acevedo and Muchhala (2018). However, we found the following morphological variation: smaller total length, ear length, third digit metacarpal length, and calcar length, as well as the smaller greatest skull and palatal length (Table 1).

*Sturnira giannae* Velazco and Patterson 2019: specimen ANDES-M 2557 was captured and collected along with individuals of *Artibeus lituratus*, and *Carollia perspicillata*. The individual was an adult male that coincides with the craniodental and external morphological characters reported by Velazco and Patterson (2019), as well as specimens ANDES-M 1869, ANDES-M 2429, and ANDES-M 2703: a) medium-sized yellow-shouldered bat; b) a slender rostrum and a globular braincase; c) dorsal pelage brown to reddish brown, dorsal hairs bicolored with a long and pale brown base (approx. 80 % of the length of each hair), and a short dark-brown terminal band (approx. 20 % of each hair); d) ventral pelage brown to reddish brown, and ventral hairs monocolored that vary from gray to pale brown; e) fur long 5-6 mm between the shoulders and 4 mm on the chest; f) the trailing edge of the uropatagium was covered by short hairs (5.0 mm); g) the proximal portion of the forearm is densely furred with short hairs; h) the dorsal surfaces of the tibia and feet were sparsely covered with long hairs; i) the III and IV metacarpals are subequal in length but shorter than

**Table 2.** Measurements of the specimens in ANDES-M collection compared to the type series of *Sturnira giannae*. Data of the type series and mean measurements from males and females were taken from Velazco and Patterson (2019). AMNH: American Museum of Natural History; ANDES-M: Mammal Collection of the C. J. Marinkelle Natural History Museum of the Universidad de los Andes; FMNH: Field Museum of Natural History; MUSM: Museo de Historia Natural, Universidad Nacional Mayor de San Marcos.

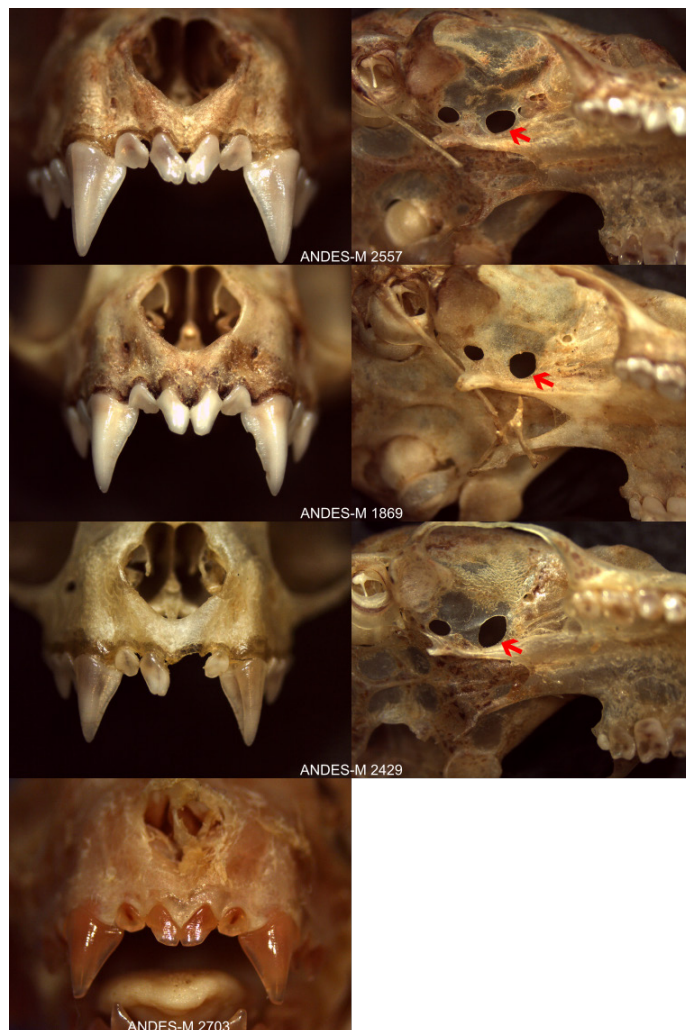
	Holotype AMNH 268545 ♂	Paratype FMNH 203582 ♀	Paratype MUSM 13260 ♀	Paratype MUSM 39228 ♂	Mean ♀ measurements	Mean ♂ measurements	ANDES-M 2557 ♂	ANDES-M 1869 ♂	ANDES-M 2429 ♀	ANDES-M 2703 ♀
<b>External measurements</b>										
Weight	25.3	14	18	22	19.3	20	19	18.5	-	-
Total length	73	67	65	73	64.9	65.8	57.1	65	53	54.2
Hind-foot length	15	13	13	12	12.7	12.8	11.9	12	11.2	11.8
Ear length	17	16	17	14	16.2	16	13	12.4	12.6	12.1
Forearm length	45	45	45	44	43.8	44.8	42.9	41.6	40.1	42
<b>Craniodental measurements</b>										
Greatest length of skull	22.7	22.6	22.3	22.2	22.2	22.8	22	22	21.6	21.7
Condylolincisive length	21.2	21.3	20.6	21.2	20.8	21.2	20.25	20.35	19.5	19.9
Condyllocanine length	20.4	20.4	19.9	20.5	20	20.4	19.35	19.6	18.9	19
Postorbital breadth	6.1	5.8	5.5	6.1	5.8	6	6	5.8	5.6	5.6
Zygomatic breadth	14.4	14	13.2	13.9	13.5	14.1	13.8	13.7	13	13.2
Braincase breadth	10.5	10.4	9.8	10.3	10.2	10.4	10.3	10.3	9.9	9.8
Mastoid breadth	12.7	12.2	11.5	11.9	12	12.4	12	12	11.6	10.5
Maxillary toothrow length	6.6	6.8	6.8	6.8	6.7	6.7	6.6	6.4	6.3	6
Breadth across molars	8.1	8.1	8.2	8.3	8.1	8.2	7.8	7.8	7.4	7.8
Dentary length	15.2	14.8	14.6	15	14.7	15.3	14.9	14.8	14.2	14.3
Mandibular toothrow length	7.5	7.8	7.6	7.7	7.6	7.8	7.1	7	6.8	6.5

the V metacarpal; j) the basisphenoids pits are divided by a narrow midline septum; and k) sphenorbital fissure oval (in ANDES-M 2557) or circular (in ANDES-M 1869, ANDES-M 2429, and ANDES-M 2703).

All revised specimens showed some morphological variations compared with the mean measurements reported by [Velazco and Patterson \(2019\)](#) which include: ANDES-M 2557 had less weight and a smaller total length, smaller ear length, and smaller forearm length; ANDES-M 1869 had less weight, smaller ear length, and smaller forearm length; ANDES-M 2429 had smaller total, hind-foot, ear, and forearm length, as well as the smaller condyloincisive and condylocanine length; and ANDES-M 2703 had a smaller total, ear, and forearm length, as well as the smaller condyloincisive length and mastoid breadth (Table 2).

*Anoura cadenai* has been recorded mainly in the south of the Andes Mountain range in Colombia, with some reports on the western slope of the western mountain range and north of the central mountain range. Our Cundinamarca record confirms the species' presence in the eastern mountain range (Figure 1a). This specimen was found in sympatry with *A. latidens*, adding to other reports of sympatry with *A. caudifer* and *A. cultrata* at the type locality ([Mantilla-Meluk and Baker 2006](#)). The main characteristics that distinguished both species were the forearm size (> 40 mm in *A. latidens*), and the narrow, semicircular, and visible uropatagium of *A. cadenai* compared to the reduced and barely visible uropatagium of *A. latidens*. Concerning the altitudinal distribution of *A. cadenai*, the information we gathered suggests elevations between 1,000 m in the type locality, and 2,900 m in El Tambo, Nariño (Appendix 1), which expands on the information provided by [Mantilla-Meluk and Baker \(2006\)](#). Morphologically, this female seems smaller in some external and craniodental characters compared to the type series ([Mantilla-Meluk and Baker 2006](#)) and to the mean values reported for the species ([Calderón-Acevedo and Muchhala 2018](#)). However, it is important to note that all the specimens in the type series correspond to male individuals.

Regarding *S. giannae*, previous records in collections and literature, as well as the new records presented here, coincide with the original distribution (eastern slopes of the Andes and adjacent Amazonian lowlands; [Velazco and Patterson 2019](#)), but adding localities from the inter-Andean valley of the Magdalena River, and on the western slope of the western mountain range (Figure 1b). These records suggest an altitudinal range in Colombia between 78 m in the Middle Magdalena Valley, and 980 m in Medina, Cundinamarca (Appendix 2) that extends 132 m the lower altitudinal limit reported for the species by [Velazco and Patterson \(2019\)](#). The reviewed specimens are smaller in some external and craniodental characters, compared to the description by [Velazco and Patterson \(2019\)](#). They also differ in the state of some characters, such as a) the proximal portion of the forearm not densely furred with short hairs in ANDES-M 1869 and ANDES-M 2429; b) a low sagittal



**Figure 2.** Variation in the upper central incisors and sphenorbital fissure of *Sturnira giannae* specimens. Red arrows indicate the sphenorbital fissure.

crest (not "well-developed") in ANDES-M 2557; and c) the upper central incisor is slightly bilobed in ANDES-M 2429 and not bilobed in ANDES-M 1869 and ANDES-M 2703 (Figure 2). However, it should be noted that [Velazco and Patterson \(2019\)](#) mentioned that the cusps are "noticeable only in younger individuals without pronounced tooth wear". Morphological variations in shape and size have also been reported in populations of *S. giannae* in Perú by [Olaya-Orihuela \(2021\)](#) and could correspond to geographic variations promoted by environmental and spatial differences ([Morales et al. 2018](#)).

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## Appendix 1

Records of *Anoura cadenai* in Colombia. ANDES-M: Colección de mamíferos del Museo de Historia Natural C. J. Marinkelle; EAFIT: Colección Biológica Universidad EAFIT; ICN: Instituto de Ciencias Naturales; MPUJ\_MAMM: Colección de mamíferos del Museo de Historia Natural de la Pontificia Universidad Javeriana; MUD-M: Colección Mastozoológica de la Universidad Distrital Francisco José de Caldas; PSO-CZ: Colección de mamíferos voladores y no voladores de la Universidad de Nariño; UV: Colección de mamíferos de la Universidad del Valle.

Specimen	Map	Locality	Latitude	Longitude	Elevation (m)	Reference
ANDES-M2591	1	Cundinamarca, La Mesa, San Nicolás	4° 38' 33.60"N	74° 27' 0.67"W	1,271	Carrasquilla et al. 2023
ICN9152 (Holotype)	2	Valle del Cauca, between the municipalities of Calima and Restrepo near the Rio Bravo	3° 56' 3.01"N	76° 29' 17.99"W	1,000	Mantilla-Meluk and Baker 2006
EAFIT-M0929	3	Antioquia, Sabaneta, La Doctora, Parque ecológico y recreativo La Romera	6° 7' 21"N	75° 36' 1"W	2,000	Rueda Isaza et al. 2022
EAFIT-M0968	4	Antioquia, Sabaneta, La Doctora, Parque ecológico y recreativo La Romera	6° 7' 21"N	75° 36' 1"W	2,000	Rueda Isaza et al. 2022
EAFIT-M0966	5	Antioquia, Sabaneta, La Doctora, Parque ecológico y recreativo La Romera	6° 7' 21"N	75° 36' 1"W	2,000	Rueda Isaza et al. 2022
MPUJ_MAMM:1109	6	Risaralda, Pereira, Corregimiento La Florida, Vereda La Suiza, Santuario de Flora y Fauna Otún Quimbaya, Montaña Cauca, filo de la montaña	4° 43' 19.84"N	75° 34' 57.32"W	-	Pérez Torres et al. 2021
UV-14761	7	Valle del Cauca, La Cumbre, Finca La Minga, Reserva Forestal Bitaco, Vereda Chicoral, Corregimiento Bitaco	3° 33' 59.10"N	76° 35' 12.4"W	-	Ruano Meneses et al. 2021
MUD-M1924	8	Huila, San Agustín, La Castellana	1° 28' 37.78"N	76° 11' 57.55"W	2,344	Rodríguez-Bolaños and Solórzano 2021
MUD-M1975	9	Huila, Pitalito, El porvenir	1° 25' 40.15"N	76° 9' 13.61"W	1,926	Rodríguez-Bolaños and Solórzano 2021
MUD-M1403	10	Putumayo, Mocoa, Campucana	1° 13' 14.29"N	76° 42' 26.97"W	1,087	Rodríguez-Bolaños and Solórzano 2021
MUD-M1400	11	Putumayo, Mocoa, Campucana	1° 13' 14.29"N	76° 42' 26.97"W	1,087	Rodríguez-Bolaños and Solórzano 2021
PSO-CZ-613	12	Nariño, El Tambo, Reserva Natural Municipal Pochurco	1° 24' 32"N	77° 22' 45.99"W	2,900	Calderón Leytón et al. 2021
PSO-CZ-615	13	Nariño, Barbacoas, Corr. Altaquer, Vda. El Barro, Reserva Natural Río Nambí	1° 18' 0"N	78° 4' 59.99"W	1,300	Calderón Leytón et al. 2021
PSO-CZ-467	14	Nariño, Barbacoas, Corr. Altaquer, Vda. El Barro, Reserva Natural Río Nambí	1° 18' 0"N	78° 4' 59.99"W	1,550	Calderón Leytón et al. 2021
PSO-CZ-907	15	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,750	Calderón Leytón et al. 2021
PSO-CZ-456	16	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,775	Calderón Leytón et al. 2021
PSO-CZ-457	17	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,775	Calderón Leytón et al. 2021
PSO-CZ-458	18	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,800	Calderón Leytón et al. 2021
PSO-CZ-466	19	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,775	Calderón Leytón et al. 2021
PSO-CZ-460	20	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,775	Calderón Leytón et al. 2021
PSO-CZ-461	21	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,800	Calderón Leytón et al. 2021
PSO-CZ-462	22	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,775	Calderón Leytón et al. 2021
PSO-CZ-463	23	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,775	Calderón Leytón et al. 2021
PSO-CZ-464	24	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,725	Calderón Leytón et al. 2021
PSO-CZ-465	25	Nariño, Ricaurte, Reserva Natural La Planada	1° 9' 15.00"N	77° 59' 57.00"W	1,775	Calderón Leytón et al. 2021

## Appendix 2

Records of *Sturnira giannae* in Colombia. The presence of vouchers for the specimens reported in the [Niño Reyes and Corral Gómez \(2022\)](#) data set was directly corroborated with the IAVH-M collection management. \*Coordinates from Google Earth. ANDES-M: Colección de mamíferos del Museo de Historia Natural C. J. Marinkelle; CZUT-M: Colección de mastozoología de la Universidad del Tolima; IAvH-M: Colección de mamíferos del Instituto de Investigación de Recursos Biológicos Alexander von Humboldt; ICN: Instituto de Ciencias Naturales; MHNUCa: Colección de Mamíferos del Museo de Historia Natural de la Universidad de Caldas; ROM: Royal Ontario Museum.

Specimen	Map	Locality	Latitude	Longitude	Elevation (m)	Reference
ANDES-M2557	1	Cundinamarca, La Mesa, San Joaquin	4° 38' 54.20"N	74° 31' 10.678"W	637	Carrasquilla <i>et al.</i> 2023
ANDES-M1869	2	Santander, Bolívar, Vereda La Guinea / Caño La Guinea	6° 2' 7.01"N*	74° 12' 2.88"W*	-	This study
ANDES-M2429	3	Santander, Cimitarra	6° 43' 0"N	74° 9' 0"W	150	This study
ANDES-M2703	4	Cundinamarca, Medina, Vereda Periquitos / Reserva La Fortuna	4° 31' 13.73"N	73° 25' 52.28"W	980	This study
MHNUCa2980	5	Risaralda, Pueblo Rico, Santa Cecilia	5° 21' 34.68"N	76° 11' 21.12"W	320	Ramírez-Chaves <i>et al.</i> 2022
MHNUCa2981	6	Risaralda, Pueblo Rico, Santa Cecilia	5° 19' 53.64"N	76° 8' 59.22"W	377	Ramírez-Chaves <i>et al.</i> 2022
MHNUCa2592	7	Arauca, Tame, Vereda Santa Inés, Finca La Porfia	6° 34' 36.52"N	71° 43' 0.01"W	253	Ramírez-Chaves <i>et al.</i> 2022
IAvH-M-10812	8	Santander, Puerto Wilches, Corredor	7° 16' 30.50"N	73° 52' 54.52"W	81	Niño Reyes and Corral Gómez 2022
IAvH-M-10821	9	Santander, Puerto Wilches, Corredor	7° 16' 23.16"N	73° 52' 57.86"W	80	Niño Reyes and Corral Gómez 2022
IAvH-M-10794	10	Santander, Puerto Wilches, El Danubio Ponderosa	7° 17' 9.96"N	73° 51' 14.04"W	98	Niño Reyes and Corral Gómez 2022
IAvH-M-10883	11	Santander, Puerto Wilches, El Tesoro	7° 17' 14.1"N	73° 50' 5.06"W	96	Niño Reyes and Corral Gómez 2022
IAvH-M-10884	12	Santander, Puerto Wilches, El Tesoro	7° 17' 13.78"N	73° 50' 3.55"W	92	Niño Reyes and Corral Gómez 2022
IAvH-M-10886	13	Santander, Puerto Wilches, El Tesoro	7° 17' 10.28"N	73° 50' 4.27"W	93	Niño Reyes and Corral Gómez 2022
IAvH-M-10889	14	Santander, Puerto Wilches, El Tesoro	7° 17' 12.08"N	73° 50' 2.36"W	97	Niño Reyes and Corral Gómez 2022
IAvH-M-10718	15	Santander, Puerto Wilches, Miraflores	7° 23' 16.01"N	73° 48' 31.32"W	84	Niño Reyes and Corral Gómez 2022
IAvH-M-10737	16	Santander, Puerto Wilches, Miraflores	7° 23' 7.15"N	73° 48' 35.86"W	78	Niño Reyes and Corral Gómez 2022
IAvH-M-10741	17	Santander, Puerto Wilches, Miraflores	7° 23' 7.15"N	73° 48' 35.86"W	78	Niño Reyes and Corral Gómez 2022
IAvH-M-10714	18	Santander, Puerto Wilches, Santa Isabel	7° 22' 34.10"N	73° 50' 27.42"W	80	Niño Reyes and Corral Gómez 2022
IAvH-M-10725	19	Santander, Puerto Wilches, Santa Isabel	7° 22' 34.10"N	73° 50' 27.42"W	80	Niño Reyes and Corral Gómez 2022
IAvH-M-10735	20	Santander, Puerto Wilches, Santa Isabel	7° 22' 33.6"N	73° 50' 27.6"W	78	Niño Reyes and Corral Gómez 2022
IAvH-M-10739	21	Santander, Puerto Wilches, Santa Isabel	7° 22' 33.6"N	73° 50' 27.6"W	78	Niño Reyes and Corral Gómez 2022
IAvH-M-10740	22	Santander, Puerto Wilches, Santa Isabel	7° 22' 33.6"N	73° 50' 27.6"W	78	Niño Reyes and Corral Gómez 2022
IAvH-M-10742	23	Santander, Puerto Wilches, Santa Isabel	7° 22' 33.6"N	73° 50' 27.6"W	78	Niño Reyes and Corral Gómez 2022
IAvH-M-10842	24	Santander, Puerto Wilches, Sogamosito	7° 18' 11.92"N	73° 46' 52.5"W	130	Niño Reyes and Corral Gómez 2022
ICN23780	25	Caquetá, Belén de los Andaquíes, Parque Andakí	1° 35' 56.43"N	75° 52' 50.91"W	764	Morales Martínez and Díaz 2020
ICN23781	26	Caquetá, Belén de los Andaquíes, Parque Andakí	1° 35' 56.43"N	75° 52' 50.91"W	764	Morales Martínez and Díaz 2020
ICN23782	27	Caquetá, Belén de los Andaquíes, Parque Andakí	1° 35' 56.43"N	75° 52' 50.91"W	764	Morales Martínez and Díaz 2020
ICN21949	28	Caquetá, Belén de los Andaquíes, vereda La Mono	1° 18' 35.52"N	75° 48' 12.09"W	273	Morales Martínez and Díaz 2020
ICN21950	29	Caquetá, Belén de los Andaquíes, vereda La Mono	1° 18' 35.52"N	75° 48' 12.09"W	273	Morales Martínez and Díaz 2020
CZUT-M2146	30	Tolima, Alvarado	4° 34' 6.75"N	74° 56' 18.3"W	-	García-Herrera <i>et al.</i> 2021
CZUT-M2147	31	Tolima, Alvarado	4° 34' 6.75"N	74° 56' 18.3"W	-	García-Herrera <i>et al.</i> 2021
CZUT-M2172	32	Tolima, Alvarado	4° 34' 6.75"N	74° 56' 18.3"W	-	García-Herrera <i>et al.</i> 2021
CZUT-M1116	33	Tolima, Ambalema	4° 50' 48.32"N	74° 48' 24.03"W	-	García-Herrera <i>et al.</i> 2021
CZUT-M1117	34	Tolima, Ambalema	4° 50' 48.32"N	74° 48' 24.03"W	-	García-Herrera <i>et al.</i> 2021
CZUT-M1118	35	Tolima, Ambalema	4° 50' 48.32"N	74° 48' 24.03"W	-	García-Herrera <i>et al.</i> 2021
CZUT-M1296	36	Tolima, Ambalema	4° 50' 48.32"N	74° 48' 24.03"W	-	García-Herrera <i>et al.</i> 2021
CZUT-M1310	37	Tolima, Ambalema	4° 50' 48.32"N	74° 48' 24.03"W	-	García-Herrera <i>et al.</i> 2021



## Appendix 2

Specimen	Map	Locality	Latitude	Longitude	Elevation (m)	Reference
CZUT-M1318	38	Tolima, Ambalema	4° 50' 48.32"N	74° 48' 24.03"W	-	García-Herrera et al. 2021
CZUT-M1342	39	Tolima, Ambalema	4° 50' 48.32"N	74° 48' 24.03"W	-	García-Herrera et al. 2021
CZUT-M1343	40	Tolima, Ambalema	4° 50' 48.32"N	74° 48' 24.03"W	-	García-Herrera et al. 2021
CZUT-M1129	41	Tolima, Armero Guayabal	5° 0' 56.5"N	74° 54' 10.9"W	-	García-Herrera et al. 2021
CZUT-M1403	42	Tolima, Armero Guayabal	5° 0' 56.5"N	74° 54' 10.9"W	-	García-Herrera et al. 2021
CZUT-M2014	43	Tolima, Ibagué	4° 21' 28.8"N	75° 9' 31.3"W	-	García-Herrera et al. 2021
CZUT-M2015	44	Tolima, Ibagué	4° 21' 28.8"N	75° 9' 31.3"W	-	García-Herrera et al. 2021
CZUT-M2016	45	Tolima, Ibagué	4° 21' 28.8"N	75° 9' 31.3"W	-	García-Herrera et al. 2021
CZUT-M2021	46	Tolima, Ibagué	4° 21' 28.8"N	75° 9' 31.3"W	-	García-Herrera et al. 2021
CZUT-M2022	47	Tolima, Ibagué	4° 21' 28.8"N	75° 9' 31.3"W	-	García-Herrera et al. 2021
CZUT-M2023	48	Tolima, Ibagué	4° 21' 28.8"N	75° 9' 31.3"W	-	García-Herrera et al. 2021
CZUT-M2028	49	Tolima, Ibagué	4° 21' 28.8"N	75° 9' 31.3"W	-	García-Herrera et al. 2021
CZUT-M1056	50	Tolima, Sebastián de Mariquita	5° 13' 4.34"N	74° 53' 52.8"W	-	García-Herrera et al. 2021
CZUT-M1061	51	Tolima, Sebastián de Mariquita	5° 13' 4.34"N	74° 53' 52.8"W	-	García-Herrera et al. 2021
CZUT-M0234	52	Tolima, Suárez	4° 0' 36.58"N	74° 50' 19.51"W	-	García-Herrera et al. 2021
CZUT-M0246	53	Tolima, Suárez	4° 0' 36.58"N	74° 50' 19.51"W	-	García-Herrera et al. 2021
CZUT-M0307	54	Tolima, Suárez	4° 0' 36.58"N	74° 50' 19.51"W	-	García-Herrera et al. 2021
CZUT-M0362	55	Tolima, Suárez	4° 0' 36.58"N	74° 50' 19.51"W	-	García-Herrera et al. 2021
CZUT-M1236	56	Tolima, Suárez	4° 0' 36.58"N	74° 50' 19.51"W	-	García-Herrera et al. 2021
ROM40313	57	Putumayo, Mocoa	1° 8' 57.88"N	76° 39' 8.94"W	-	García-Herrera et al. 2021
ROM40349	58	Putumayo, Mocoa	1° 8' 57.88"N	76° 39' 8.94"W	-	García-Herrera et al. 2021
ROM40373	59	Putumayo, Mocoa	1° 8' 57.88"N	76° 39' 8.94"W	-	García-Herrera et al. 2021
ROM40374	60	Putumayo, Mocoa	1° 8' 57.88"N	76° 39' 8.94"W	-	García-Herrera et al. 2021
ROM40375	61	Putumayo, Mocoa	1° 8' 57.88"N	76° 39' 8.94"W	-	García-Herrera et al. 2021
ROM49184	62	Putumayo, Mocoa	1° 8' 57.88"N	76° 39' 8.94"W	-	García-Herrera et al. 2021