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First records of *Sturnira bakeri* Velazco & Patterson, 2014 (Chiroptera: Phyllostomidae) from Colombia

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Abstract: We evaluate the occurrence of *S. bakeri* in Colombia, a recently described species. We report seven new records and include data on skull measurements of these individuals and information on the new localities. A discriminant analysis suggests that condyloincisive length and dentary length are the most important measurements to separate *S. bakeri* and *S. luisi* from *S. lilium*. However, to distinguish *S. bakeri* from *S. luisi*, we used discrete characters proposed in the original descriptions of these two taxa. *Sturnira bakeri* should no longer be considered a regionally endemic species from Ecuador and Peru.

Key words: new records; yellow-shouldered bats; endemism; species richness; *Sturnira luisi*

Sturnira Gray, 1842 is a genus of frugivorous bats distributed across the Neotropics from Mexico to northern Argentina, including some islands in the Caribbean (Velazco & Patterson 2013). Species within this genus are important during successional stages in Neotropical forests (Muscarella & Fleming 2007), establishing mutualistic associations mainly with plants of the genus *Piper* and *Solanum* (Saldaña-Vázquez et al. 2013; Montoya-Bustamante et al. 2016).

With 23 recognized species, *Sturnira* is the most species rich genus in the family Phyllostomidae (Velazco & Patterson 2014; Molinari et al. 2017), which had its initial radiation in the Andes of South America (Velazco & Patterson 2013). As a product of a recent taxonomic revision of the genus, two new species were described: *S. bakeri* and *S. burtonlimi* (Velazco & Patterson 2013, 2014). Currently, both of these taxa are represented by a limited number of specimens; thus, *S. bakeri* was thought to be endemic to southwestern Ecuador (Velazco & Patterson 2014; Tirira 2015).

The type series of *S. bakeri* includes specimens from two localities in southwestern Ecuador: Palmales, Reserva Militar Arenillas, El Oro (03°40′27.4″ S, 080°06′20.0″ W; elevation: 49 m) and Quebrada Seca, Fuerte Militar Arenillas, El Oro (03°39′24.1″ S, 080°10′56.2″ W, elevation: 43 m). Therefore, there was a high probability that this species inhabits northwestern Peru rather than elsewhere (Velazco & Patterson 2014). Recently, Sánchez & Pacheco (2016) tested this hypothesis and reported the presence of *S. bakeri* from six localities in northwestern Peru. No further information has been published on *S. bakeri* and its geographic distribution remains obscure. Our aim was to evaluate the occurrence of *S. bakeri* in Colombia, as well as to increase our knowledge of the morphological variation and distributional pattern of this species.

An exhaustive review of *Sturnira* specimens deposited in the mammal collection of Universidad del Valle (UV) was conducted using the original description of *S. bakeri* (Velazco & Paterson 2014). We compared putative specimens of *S. bakeri* with representatives of morphologically and phylogenetically closely related species in the genus (*Sturnira luisi* Davis, 1980 and *Sturnira lilium* (É. Geoffroy, 1810)). Studied specimens are listed in the Appendix. Although Velazco & Patterson (2013) restricted the distribution of *S. lilium* to the Brazilian Shield, they did not clarify its status in Colombia (Ramírez-Chaves et al. 2016). Therefore, in this study we still identify as *S. lilium* those specimens that agree with its description.

Date, sex and information on capture localities were taken from museum tags. Whenever specimen coordinates were not available in museum labels, they were calculated through direct projection using Arcgis 10.2.2 software. Georeferencing was made by association to a physical element (single point), and each locality was located in the map (Table 1; Figure 1). Cartography from SIGOT's data bank was used, and georeferencing was based on MAGNA SIRGAS-WGS84 systems.

Standard mammal measurements were taken from each museum specimen's tag, and if not available were measured directly when possible (Table 2). Cranial measurements were taken from *S. bakeri* (n = 7), *S. lilium* (n = 19), and *S. luisi* (n = 18) using a Mitutoyo digital caliper (to the nearest 0.05 mm) following Velazco & Paterson (2014). With these data and the published measurements of *S.*

Table 1. Records of *Sturnira bakeri* in Colombia from the mammal collection of Universidad del Valle (UV).

	UV 2150*	UV 3178*	UV 4136*	UV 4540*	UV 10817*†	UV 10818*	UV 11932
Department	Valle del Cauca	Valle del Cauca	Chocó	Chocó	Chocó	Chocó	Valle del Cauca
Municipality	Buenaventura	Restrepo	San José del Palmar	San José del Palmar	San José del Palmar	San José del Palmar	Bugalagrande
Locality	Quebrada San Joaquín, Bajo Calima	Río Bravo	Paso de Galápagos	Alto del Oso 10 km al oeste de La Italia	La Italia	La Italia	La Morena, Galicia
Coordinates	03°57′03.99″ N, 077°00′52.66″ W	03°52′29.1″ N, 076°37′42.45″ W	04°49′00″ N, 076°11′00″ W	04°54′20.95″ N, 076°22′53.54″ W	04°50′11.04″ N, 076°17′45.959″ W	04°50′11.04″ N, 076°17′45.99″ W	04°08′18″ N, 076°03′43″ W
Altitude (m)	400	N/A	2000	N/A	N/A	N/A	1860
Life zone‡	Premontane rain forest	Premontane wet forest	Lower montane wet forest	Lower montane wet forest	Lower montane wet forest	Lower montane wet forest	Not identified
Date	14 Sep 1979	28 Apr 1981	12 Oct 1984	2 Aug 1985	22 May 1992	22 May 1992	24 Feb 1999
Sex	Male	Female	Male	Female	Male	Female	Male
Collected by	M. Alberico	C. Caicedo	E. Velasco	M. Alberico	J. Bustos	A. Villegas	V. Rojas-Díaz
Previous identification	*S. luisi*	*S. luisi*	*S. luisi*	*S. luisi*	*S. luisi*	*S. luisi*	*S. lilium*

* These specimens' coordinates were calculated due to lack of information
† This specimen shows all *S. bakeri* traits except bicuspidate I1
‡ Life zone according to IGAC (1988)

bakeri (Velazco & Paterson 2014), a linear discriminant analysis was performed to assess morphometric differences between *S. bakeri* and its closely related species. Total length, hindfoot length, ear length and weight were not included in the analysis because they were not available for all specimens. Mahalanobis distances and its posterior classification probabilities were used to determine if individuals were correctly assigned to each particular group.

We document the presence of seven Colombian specimens representing *S. bakeri*. These specimens matched the morphological description of the species and were previously misidentified as *S. luisi* (n = 6) and *S. lilium* (n = 1) (Table 1). One of them (UV 10817), despite having all the other skull and skin traits characteristic of *S. bakeri*, does not have bicuspidate I1 and there is no sign of wear. Notwithstanding, it was collected at the same date and place of UV 10818, a typical *S. bakeri* (Figure 1). Dorsal fur varied from dark brown to a light yellowish brown, while ventral fur varied from pale brown to a yellowish beige. The presence of yellowish epaulettes is conspicuous in all specimens, males and females, with the exception of specimen UV 10818.

Comparative measurements and weights from the holotype of *S. bakeri* (Velazco & Patterson 2014) and *S. bakeri* individuals reported herein are shown in Table 2. The linear discriminant analysis revealed morphological differences among the three analyzed groups (Figure 2). The first root explained 81.8% of the variability among groups, separating *S. bakeri* and *S. luisi* from *S. lilium*. The second discriminant function explained 18.2% of the variability, allowing us to differentiate *S. bakeri* from *S. luisi*. Condyloincisive length (CIL) and dentary length (DL) were the most important measurements to separate *S. lilium* from *S. bakeri* and *S. luisi* (standard coefficients for root 1: CIL = –1.40, DL = –0.99). Condylocanine length (CCL) and dentary length (DL) were the most important measurements to differentiate *S. bakeri* from *S. luisi* (standard coefficients for root 2: CCL=2.23, DL = –1.84). The posterior probabilities classified all the studied individuals according to their a priori assignment.

Here we present the first records of *S. bakeri* from Colombia. Six new localities were identified for this taxon in Colombia, extending this species' range by 1,034 km north from previous closest record (Table 1). Altitude varied from 400 to 2,000 m, and three life zones were identified for the species distribution: premontane wet forest, premontane rain forest, and lower montane wet forest.

According to Velazco & Patterson (2014), *S. bakeri* might be confused with *S. lilium* and *S. luisi*, but our morphologic analyses show it is easily recognizable by its skull. The most useful characters we used to distinguish *S. bakeri* from *S. lilium* and *S. luisi* were: a globular braincase with a slender rostrum (Figures 3, 4); a well-developed sagittal crest (Figure 5); an oval sphenorbital fissure (Figure 6); an absent anterior process of the glenoid fossa (Figure 7); well-developed clinoid processes (Figure 8); usually bicuspidate upper inner incisors with a small lateral cusp

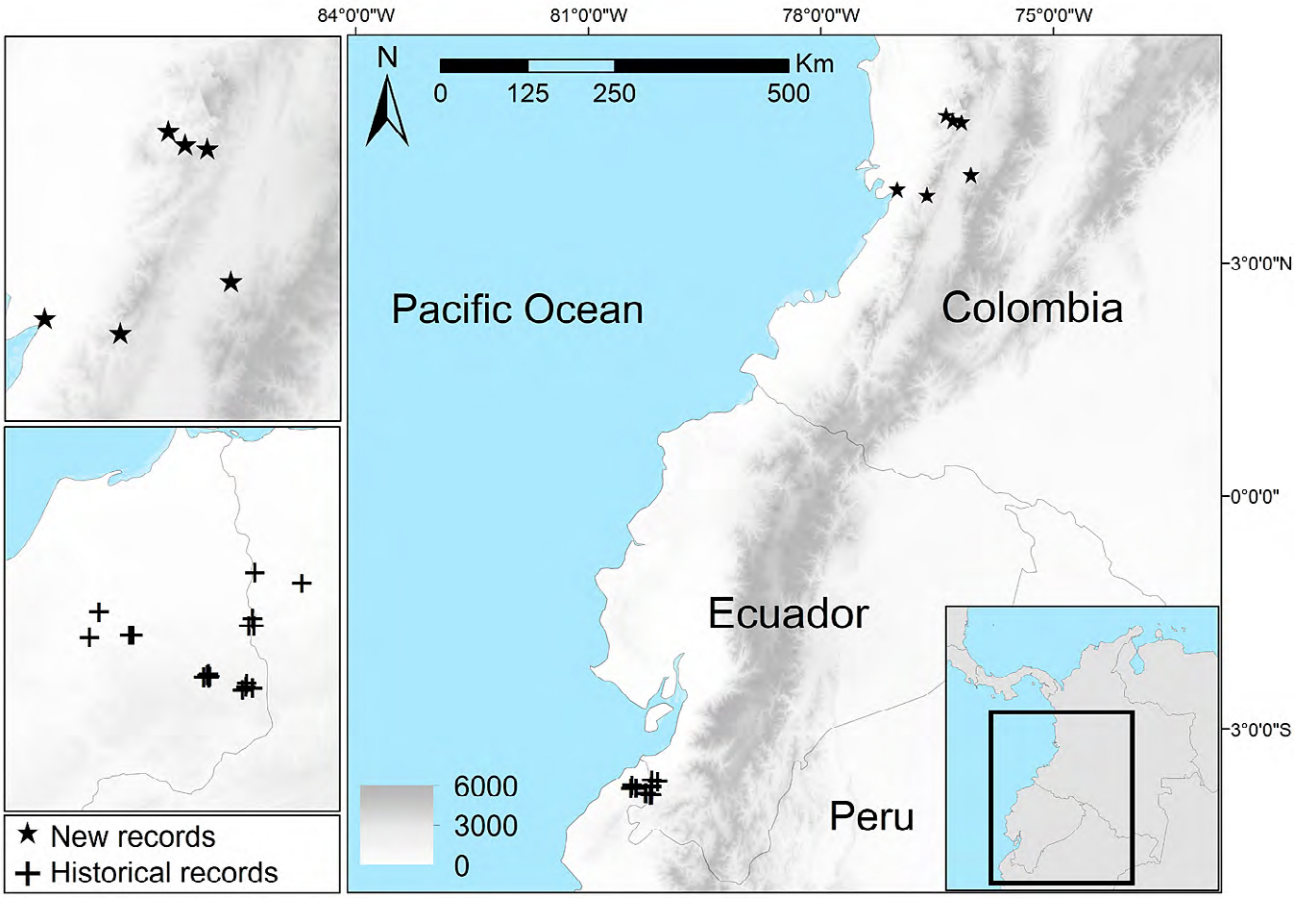

Figure 1. Historical records of *Sturnira bakeri* in Ecuador and Peru and new records from Colombia.

Table 2. Comparative measurements (mm) and weights (g) of the recorded *Sturnira bakeri* from Colombia and the type series. Measurements were taken according to Velazco and Patterson (2014). GLS: greatest length of skull, CIL: condyloincisive length, CCL: condylocanine length, BB: braincase breadth, ZB: zygomatic breadth, PB: postorbital breadth, MB: mastoid breadth, MTL: maxillary toothrow length, WM2: width at M2, DL: dentary length, MDTL: mandibular toothrow length, FL: forearm length, TL: total length, HL: hindfoot length, EL: ear length, W: weight.

	Measurements															
Specimen	**GLS**	**CIL**	**CCL**	**BB**	**ZB**	**PB**	**MB**	**MTL**	**WM2**	**DL**	**MDTL**	**FL**	**TL**	**HL**	**EL**	**W**
Holotype*	22.7	21.1	20.3	10.4	13.5	5.9	11.9	6.9	8.3	15	7.7	45	65	14	14	18.7
UV 2150	23.5	22.5	21	10.5	13.8	6	12	6.9	7.7	14.7	7.7	43	67	13	17	20
UV 3178	22.58	21.53	20.9	10.78	13.55	5.78	12.1	6.9	8.19	14.87	7.78	43	62	13	14	19.6
UV 4136	22.12	20.96	20.31	10.73	13.93	5.75	11.85	6.94	7.76	14.55	7.52	46	71	13	13	26
UV 4540	23.02	21.55	20.9	10.87	14.33	5.94	12.46	6.9	8.29	15.07	7.55	42	66	12	17	24
UV 10817	22.79	21.43	20.65	10.81	14	6.21	12.35	7.23	8.21	14.85	7.93	42.08	72	11	15	24
UV 10818	22.12	21.02	20.3	10.49	13.56	5.91	12.04	6.82	7.93	14.65	7.4	42	79	12	16	20
UV 11932	21.91	20.54	19.87	10.52	13.43	5.8	11.96	6.52	7.62	14.07	7.36	41.11	65	14	18	20

* QCAZ 14635♀, data from Velazco & Patterson (2014).

(Figure 9); well-defined metaconid and entoconid in m1 and m2, which are separated by a deep notch (Figures 10, 11); and tricuspidate lower incisors; all of these characteristics were proposed by Velazco & Patterson (2014). We did not find these traits to be variable, as mentioned by Sánchez & Pacheco (2016).

Despite the upper inner incisors and their cusps have been suggested as useful characters to differentiate other species of *Sturnira* (e.g., *S. oporaphilum* and *S. ludovici* from *S. hondurensis* and *S. burtonlimi*; Velazco & Paterson 2014), they seem to be variable in our series of *S. bakeri*. Although, upper inner incisors of specimen UV 10817 did not match the description of *S. bakeri*, its classification

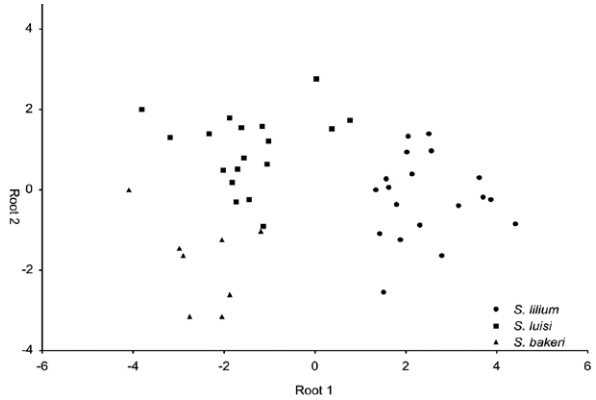

Figure 2. Morphometric comparison of *Sturnira bakeri*, *S. lilium*, and *S. luisi* from Colombia. Results from the linear discriminant analysis.

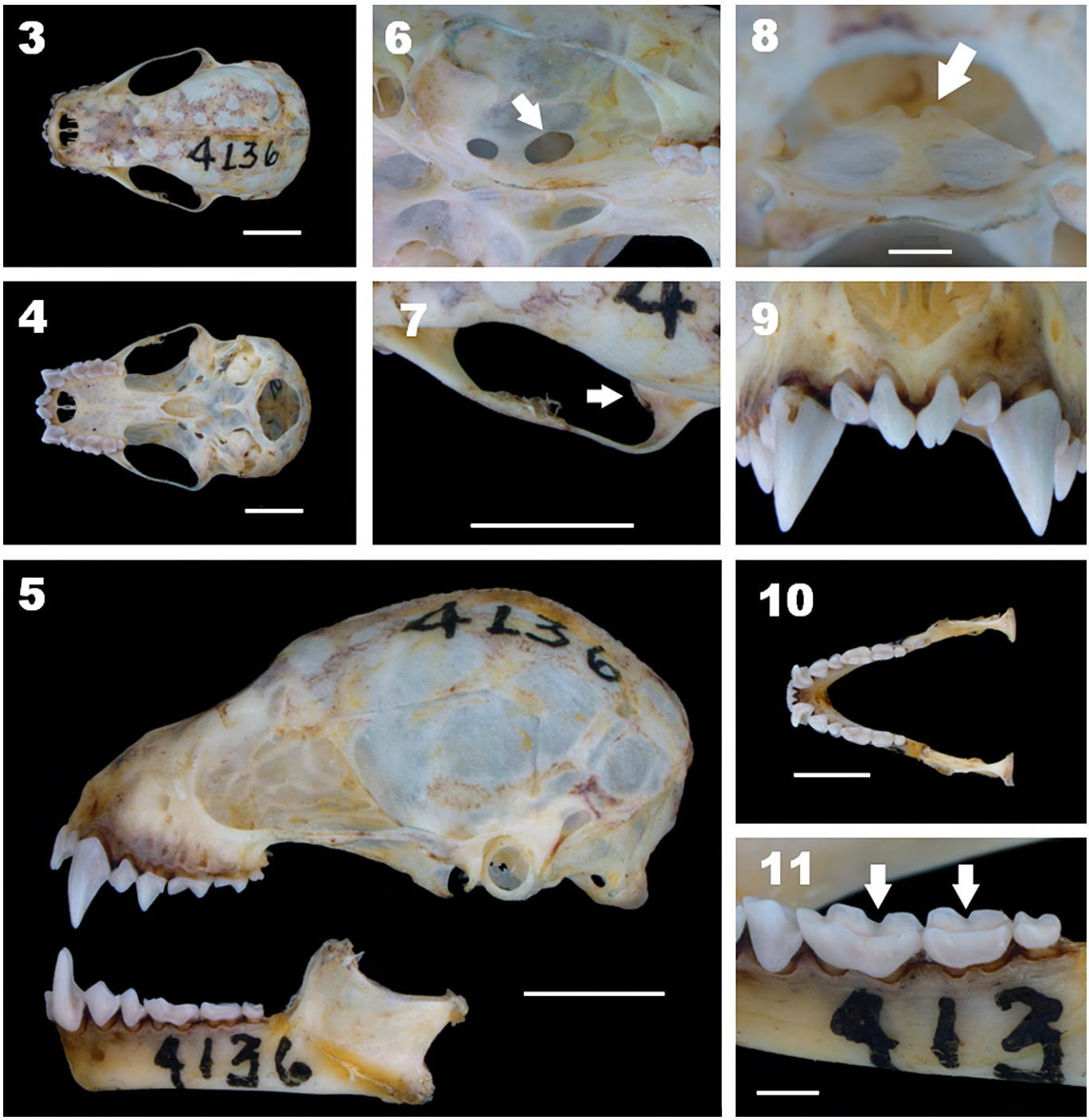

Figure 3–11. Skull traits of *Sturnira bakeri*, taken from specimen UV 4136. **3, 4.** Dorsal and ventral view of the cranium. Scale bar: 5 mm. **5.** Lateral view of the cranium and mandible. Scale bar: 5 mm. **6.** Ventrolateral view of the right orbital region, showing the oval shaped sphenorbital fissure (white arrow). Scale bar: 1 mm. **7.** Dorsal view of the left zygomatic arch, showing the absence of an anterior process of the glenoid fossa (white arrow). Scale bar: 5 mm. **8.** Posterior view of the basioccipital through the foramen magnum, showing the well-developed clinoid process (white arrow). Scale bar: 1 mm. **9.** Anterior view of the upper incisors and canines, showing the bicuspidated I1. **10.** Dorsal view of the mandible. Scale bar: 5 mm. **11.** Dorsolateral view of the left mandibular toothrow, showing the well-defined notch separating the metaconid and entoconid of m1-m2 (white arrows). Scale bar: 5 mm. Photos by J. F. Ortega.

within this taxon was supported by the other morphologic characters mentioned above, and by our discriminant analysis as well.

Velazco & Patterson (2014) also proposed some external characters useful to identify *S. bakeri*, including hair color and length. However, as noted by Sánchez & Pacheco (2016) pelage traits may be very variable within this species, as in other *Sturnira* species (Tamsitt et al. 1986). Thus, skin characters should be used only to complement identifications based on skull characters and should not be considered as diagnostic.

Results from the discriminant analysis show that *S. bakeri* and *S. luisi* can be distinguished from *S. lilium* using condyloincisive length and dentary length, which are smaller in *S. lilium* (Table 3). Despite condylocanine length and dentary length were the most important variables to

Table 3. Comparative skull and forearm measurements of *S. bakeri, S. lilium* and *S. luisi* from Colombia. Variables defined in Table 2 caption. $\bar{x}$: mean; SD: standard deviation.

	Species								
	***S. bakeri* (*n* = 7)**			***S. luisi* (*n* = 18)**			***S. lilium* (*n* = 19)**		
Variable	$\bar{x}$	±	**SD**	$\bar{x}$	±	**SD**	$\bar{x}$	±	**SD**
GSL	22.59	±	0.53	22.74	±	0.49	21.75	±	0.56
CIL	21.33	±	0.58	21.54	±	0.44	20.09	±	0.41
CCL	20.53	±	0.40	20.71	±	0.48	19.42	±	0.41
BB	10.64	±	0.17	10.61	±	0.34	10.08	±	0.43
ZB	13.76	±	0.31	13.90	±	0.34	13.10	±	0.54
PB	5.91	±	0.14	5.85	±	0.39	5.76	±	0.19
MB	12.08	±	0.21	12.11	±	0.31	11.57	±	0.44
MTL	6.88	±	0.19	6.82	±	0.34	6.46	±	0.23
WM2	8.00	±	0.28	8.04	±	0.27	7.77	±	0.30
DL	14.72	±	0.32	14.40	±	0.40	13.53	±	0.35
MDTL	7.62	±	0.19	7.59	±	0.22	7.23	±	0.29
FL	43.77	±	1.99	43.03	±	1.73	41.09	±	1.42

differentiate *S. bakeri* from *S. luisi*, these measurements overlap (Table 3), suggesting that these variables should not be the only ones used to separate these species. However, the correct classification of groups using the posterior probabilities suggest that the skull measurements and traits proposed by Velazco & Patterson (2014) (with the exception of bicuspidate I1) are the best way to discriminate *S. bakeri* from *S. luisi*.

Our findings confirm the presence of *S. bakeri* in Colombia, and add new information on its distribution and morphological variation within this taxon. Contrary to the type locality, our specimens were collected in wet and rain forests. In Colombia, lower montane wet forests are widely distributed across the Andes; their mean temperature varies from 12–18 °C, and mean annual rainfall oscillates from 2,000–4,000 mm (IGAC 1988).

On the other hand, mean temperature at premontane wet forests varies from 18–24 °C, and mean annual rainfall varies from 2,000–4,000 mm; in Colombia, this life zone can be found especially in the coffee zone. At last, premontane rain forests are principally located in the eastern slope of Eastern Andes cordillera and the western slope of Western Andes cordillera (Chocó Biogeográfico) (IGAC 1988). The latter, the Chocó Biogeográfico, is considered as a "hotspot" for phyllostomid bats (Mantilla-Meluk et al. 2009), and is one of the most humid ecosystems in the world due to interception of coastal winds (Kattan et al. 2004). Its mean temperature varies from 18–24 °C, and mean annual rainfall varies from 4,000–8,000 mm (IGAC 1988).

Colombian localities of *S. bakeri*, specifically those from the Chocó Biogeográfico (UV 2150, 4136, 4540, 10817 and 10818) are characterized by high plant diversity with a good representation of genera included in *Sturnira* diet, such as: *Vismia*, *Piper*, and *Cecropia* (Faber-Langendoen & Gentry 1991; Rangel-Ch. et al. 2011; Lobova et al. 2009; Montoya-Bustamante et al. 2016). Specimen UV 11932 was collected in a highly disturbed locality, characterized by the presence of coffee and banana crops with a riparian forest relict, near Bugalagrande river (V. Rojas-Díaz com. pers.). This new information suggests that *S. bakeri* in Colombia occupies a wide variety of habitats, including highly disturbed areas by human activities. These new localities for *S. bakeri* increase substantially the known distribution of this taxon that should no longer be considered as endemic.

Finally, our study represents an important example of the significance of collecting specimens for biological collections and of the relevance of collection-based studies, a matter recently in debate (Minteer et al. 2014; Rocha et al. 2014). Although *S. bakeri* was recently described, specimens in the UV collection had been deposited there more than 30 years ago and prove that biological collections are an invaluable and continuous source of new information on biodiversity and natural history.

In conclusion, our findings add to the knowledge of the ecology of *S. bakeri*, previously only known from dry forests. Our data support the occurrence of this species in premontane wet forests, premontane rain forests, and lower montane wet forests. The distribution of *S. bakeri* is not as restricted as originally thought. Further studies should clarify the nature of the distribution of this species and whether it has a continuous or discontinuous distribution. With these new records the known mammalian species richness from Colombia increases to 521 (Solari et al. 2013; Ramírez-Chaves & Suárez-Castro 2014; Ramírez-Chaves et al. 2016; Mantilla-Meluk & Montenegro 2016; Molinari et al. 2017).

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APPENDIX

Specimens of *Sturnira* revised from the mammal collection of Universidad del Valle (UV)

Sturnira lilium — **Caldas.** Hacienda La Española, Corregimiento Guarinocito, Municipality La Dorada, 05°21′50.7″ N, 076°32′23.5″ W (UV 14909-14911, 14936-14940). **Caqueta.** Hacienda Tres Esquinas km 110 carretera Villagarzón a San José de Fragua, Municipality San José de Fragua (UV 11450, 11460); Puerto Bello Caquetá, Municipality San José del Fragua (UV 11377, 11420). **Cauca.** Bosque 2 km de entrada Vereda El Carbonero, Vereda El Carbonero, Municipality Santander de Quilichao, 02°59′28″ N, 076°28′44″ W (UV 14521, 14543); Corregimiento Puerto Bello, Municipality Piamonte, 01°08′14″ N, 076°16′55″ W (UV 11862-11864); Finca La Hacienda, Vereda El Cofre, Municipality Cayibio (UV 13160); Municipality Leyva (UV 4005, 4007, 4014); Vereda El Palo, Municipality Caloto (UV 13502, 13503); Vereda Morales, Municipality Caloto, 02°59′43.7″ N, 076°24′21.2″ W (UV 13693, 13818-13820, 13906). **Cundinamarca.** Finca Santa Lucia, Vereda Servitá, Municipality Guayabetal, 04°03′70.8″ N, 073°47′10.5″ W (UV 13955). **Guanía.** Río Inírida, 02°14′N, 069°59′W (UV 2764). **Meta.** Carimagua, Municipality Puerto Gaitan (UV 3317), Casa Hato Altagracia, Municipality Carimagua (UV 3318). **Nariño.** Municipality Junín (UV 3044). **Putumayo.** Centro Experimental Amazónico, Vereda San Carlos, Municipality Mocoa, 01°05′04″ N, 076°37′48″ W (UV 14258); Finca La Joya, Vereda Champagnat, Municipality Villagarzón, 00°57′32″ N, 076°34′22″ W (UV 14226); Finca Señor Luis Rodríguez, Vereda Champagnat, Municipality Villagarzón, 00°57′36″ N, 076°34′45″ W (UV 14332); Finca Señor Samuel Guerra, Vereda Champagnat, Municipality Villagarzón, 00°57′27″ N, 076°34′46″ W (UV 14270). **Quindío.** Vereda Boquía, Municipality Salento, 04°41′22.5″ N, 075°33′02″ W (UV 13459). **Risaralda.** Santuario de Flora y Fauna Otún Quimbaya, Vereda La Suiza, Corregimiento La Florida (UV 12687); Vereda San José, Municipality Belén de Umbría, 05°12′37″ N, 75°51′22″ W (UV 14100). **Valle del Cauca.** 1 km al occidente de la planta eléctrica del Lago Calima a la carretera a Campo Alegre (UV 2146, 2147); 2 km al sur de Pance aproximadamente 20 km al suroeste de Cali (UV 142); Alto del Tigre Bosque de Morales cuenca de Río Grande, Vereda Morales, Municipality La Cumbre, 03°44′08″ N, 076°35′19″ W (UV 14006); Atuncella, Municipality Dagua (UV 11087), Bosque El Medio Hacienda El Medio Municipality Zarzal (UV 10389, 10662); Municipality Cali (UV 12694); Campamento Campo Alegre confluencia río Calima río Bravo (UV 11185); Campamento Río Azul Río Calima Municipality Darien (UV 11747, 11755, 11764, 11769); Corregimiento Tienda Nueva, Municipality Palmira, 3°34′15″ N, 076°13′14″ W (UV 13913); Cuenca Río Sonsito, Vereda Sonsito, Corregimiento El Vínculo, Municipality Buga, 03°49′41.3″ N, 076°16′43.4″ W (UV 14617, 14618); Ecoparque Lago de las Garzas, Municipality Cali, 03°18′56.8″ N, 076°32′29″ W (UV 13604); El Hormiguero aproximadamente 20 km al sureste de Cali (UV 144, 145, 10161, 10911, 11253); El Saladito, Municipality Cali, (UV 10499); Estación Biológica Cerro El Inglés Municipality El Cairo (UV 12229); Estación Biológica El Vínculo, Municipality Buga (UV 8142, 8143, 10570, 10576); Finca El Guabal Mediacanoa, Municipality Viges, 03°44.6′N, 076°24.8′W (UV 12096); Finca Guanabano, Vereda Río Bravo, Municipality Restrepo (UV 3176); Finca La Alvania, Vereda

El Delirio, Corregimiento Miravalle, Municipality Yotoco (UV 13443, 13444); Finca La Selva, Vereda Villamaria, Municipality Viges, 03°43.64′N, 076°28.62′W (UV 12094); Finca Las Acacias, Vereda El Aguacate, Municipality Restrepo, 03°46′47.11″ N, 076°32′19.10″ W (UV 14843); Granja Agroforestal Bajo Calima (UV 3174); Guadual Hacienda Alabama, Vereda La Estrella, Municipality Sevilla, 04°18′20″ N, 075°59′55″ W (UV 11938); Hacienda Chaquiral, Municipality La Victoria (UV 4009-4011, 4016, 4017); Hacienda El Chachafruto, Vereda La Morena, Corregimiento Galicia, Municipality Bugalagrande, 04°08′18″ N, 076°03′43″ W (UV 11931, 11933, 11935-11937); Humedal El Avispal, Vereda El Avispal, Corregimiento Quinamayó, Municipality Jamundí (UV 13412); Humedal El Zanjón del Burro, barrio Ciudad Jardín, Municipality Cali, 03°21′38.77″ N, 076°32′24.6″ W (UV 14409); Lago Calima, Municipality Darien (UV 11233); Lago Reten de Pance 8 km al sur 1 km al este de Cali, Municipality Cali, 03°22′ N, 076°32′ W (UV 4350); Llanobajo, Municipality Buenaventura (UV 10537); Madre vieja Yocambo, Municipality Yotoco, 03°52′18.1″ N, 076°22′10.0″ W (UV 13694); Margen derecha confluencia río Bitaco río Grande juntas de Bitaco límites con La Cumbre y Dagua, Municipality Restrepo, 03°45′44″ N, 076°37′53″ W (UV 14011, 14013); Parcelación El Silencio, Vereda La Elvira, Corregimiento La Elvira, Municipality Cali, 03°32′43″ N, 076°35′44″ W (UV 14648); Puerto Dagua (UV 4008); Quebrada Palmar Atuncela, Municipality Dagua (UV 11085); Quebrada Palmar Atuncela, Municipality Dagua (UV 11086); Quebrada San Joaquin 8 km al sur 3 km al este de Bajo Calima (UV 2151); Reserva Forestal de Yotoco, Municipality Yotoco (UV 2022, 2023); Reserva La Mariposa, Corregimiento Villa Carmelo, Municipality Cali, 3°23′26″ N, 076°36′24″ W (UV 13828, 14039, 14040); Reserva Liverpool entre Veredas La Gaviota y El Rubí Municipality Yotoco (UV 13361, 13369); Reserva Natural El Hatico, Municipality Cerrito (UV 11811-11813); Reten Pance, Municipality Cali (UV 4349); Río Chanco, finca El Amparo, Municipality Ansermanuevo (UV 12137-12139, 12140, 12141); Río Pance 2 km al este de Pueblo Pance, Municipality Cali (UV 3441, 3497-3501, 3503, 3883, 4013, 4348); Río Pance (UV 2789-2791, 4012); Topacio, Parque Nacional Natural Farallones de Cali, 03°19′ N, 076°39′ W (UV 7415); Vereda El Avispal, Corregimiento Quinamayó, Municipality Jamundí (UV 13422, 13424); Vereda La Colonia, Corregimiento El Caney, Municipality Yotoco (UV 13495, 13496); Vereda Montañitas, Municipality Yumbo (UV 11112, 11114, 11115); Vereda Mozambique, Municipality La Cumbre (UV 13692). **No data.** (UV 11208).

Sturnira luisi — **Chocó.** 10 km debajo de la Italia Municipality San José del Palmar (UV 4138); 4 km norte la Italia San José del Palmar (UV 10018). **Nariño.** Inguapi del Guadal aproximadamente 15 km al oriente de Tumaco, Municipality Tumaco (UV 3039, 4705, 4706); La Planada de Mández, Municipality Junín (UV 3039, 3065). **Valle del Cauca.** Alto Anchicayá vía túnel Murrapal, Municipality Buenaventura, 03°33′ 08.7″ N, 076°52′57.36″ W (UV 13681); Campamento Río Azul confluencia del Río Azul en Río Calima, Municipality Buenaventura, (UV 11183, 11184); Campamento Río Azul Río Calima CVC (UV 11183); Estación Agroforestal Bajo Calima, Municipality Buenaventura (UV 11609, 11610); Finca Guanábano Vereda Ríobravo, Municipality Restrepo (UV 3175, 3177, 3179); Finca La Guayacana, Municipality Darien (UV 3520); Llano bajo, Municipality Buenaventura (UV 10538); Túnel Murrapal, represa Alto Anchicayá, Municipality Buenaventura, 03°33′9″ N, 076°52′57″ W (UV 14370, 14371).