

Taxonomy

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**COELIGENA VIOLIFER ALBICAUDATA (AVES, TROCHILIDAE):
 A NEW HUMMINGBIRD SUBSPECIES FROM THE
 SOUTHERN PERUVIAN ANDES**

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Key words: *Coeligena violifer albicaudata*, *subsp. nov.*, *Coeligena violifer dichroua*, *Coeligena violifer osculans*, *Coeligena violifer violifer*, *Trochilidae*, *Cordillera Vilcabamba*, *southern Peru*, *geographical variation*.

INTRODUCTION

During a biogeographical survey of the inca hummingbirds and starfrontlets (*Coeligena* spp.), our attention was drawn to a hitherto undescribed southern Peruvian population of the Violet-throated Starfrontlet (*Coeligena violifer*). This population is distinguished from the chestnut-tailed *C. v. violifer*, *C. v. osculans*, and *C. v. dichroua* mainly by its whitish rectrices (r2–r5). The new white-tailed subspecies to some extent fills the distributional gap between the SE Peruvian *osculans* and the N and central Peruvian *dichroua*. We suppose that the patchy Andean occurrence of all subspecies is more a result of lack of information than of actual spatial separation.

To our knowledge, the first individuals of the new white-tailed subspecies of *C. violifer* were discovered in July–August 1967 in the Cordillera Vilcabamba, Dept. Cuzco, (specimens in American Museum of Natural History, New York: AMNH 820355, 820499, 820500, 820526, 820535) and, about one year later, in Dept. Cuzco and in Dept. Ayacucho, Peru (additional specimens in AMNH), by John S. Weske and John W. Terborgh. Although Fjeldsø & Krabbe (1990: 265, 758–759) depicted this taxon as an “unnamed ssp.” in their “Birds of the high Andes,” the race still needs to be designated formally.

A total of twenty-six specimens of the new taxon — 20 specimens (10 adult males, 2 im-

mature males, 5 adult females, 3 immature females) held by the AMNH; 2 specimens (1 adult male, 1 adult female) from the Museum of Natural Science, Louisiana State University, LSUMZ, Baton Rouge; and 4 specimens (3 adult males, 1 adult female) from the Zoologisk Museum Copenhagen, ZMUC — were available for comparison with *Coeligena violifer violifer* (15 adult males, 1 immature male, 3 adult females, from the AMNH, ZMUC, and the Zoologisches Forschungsinstitut und Museum Alexander Koenig, ZFMK, Bonn, collections), *C. v. osculans* (3 adult males, 5 adult females, AMNH, ZMUC), and *C. v. dichroua* (8 adult males, 4 adult females, AMNH, ZMUC). For further details see the Appendix. We propose to name the new subspecies as follows:

Coeligena violifer albicaudata subsp. nov.

Holotype. American Museum of Natural History specimen, # AMNH 820535; adult male from Dept. Cuzco, Cordillera Vilcabamba, Peru, 12°36'S, 73°30' W, mist-netted in elfin forest at 3300 m, collected by John S. Weske and John W. Terborgh, 5 August 1967.

Diagnosis. Differs from all other subspecies mainly by its white rectrices r2–r5 with a distal faded green band (Fig. 1). Inner rectrix gray-green.

Distribution. Known from the mountains on both sides of the Apurímac River in the depart-

ments of Cuzco (Cordillera Vilcabamba, c. 12°36'S, 73°30'W), Apurímac (Bosque Ampay, c. 11°38'S, 72°57'W), and Ayacucho (Puncu, near Tambo, 12°47'S, 73°49'W, Uchuy Monte, 12°49'S, 73°50'W). Distance to next subspecies *Coeligena violifer osculans* in the SW Peruvian Andes c. 190 km, and to the NE subspecies *Coeligena violifer dichroua* c. 150 km, see Fig. 2.

Description of holotype. Bill straight (41.2 mm), black. Upper mandible feathered proximally (6.7 mm). Head bottle green, forehead with a basal patch of iridescent turquoise, lores black. Back shiny golden-copper. Chin mossy green, throat patch violet, breast mossy green, belly golden green, undertail coverts tan with pale buff fringes. Rectrices r2–r5 whitish, distal parts faded green forming a small contrasting band (c. 11 mm); central rectrices (r1) dark faded green. Wing blackish, wing coverts coppery green.

Description of female. Syntype AMNH 820538. Similar to male. Chin with large green discs with blackish fringes, breast darkish green, belly shiny golden green (light green disks fringed beige). Rectrices r2–r5 white beige with faded green distal band, fringed gray to beige.

Description of immature. Syntype AMNH 820743. Immature resembles adult female, but with head and hind neck feathers fringed maroon, disappearing with age. Rectrices r2–r5 beige-brown, becoming white in birds of increasing maturity. This information is based on specimens of different age classes.

Etymology. This subspecies is named in allusion to its white tail, which distinguishes it from all other, "brown-tailed" *Coeligena violifer* subspecies.

Adult male plumage characteristics of other Coeligena violifer subspecies differing from Coeligena violifer albicaudata

Coeligena v. violifer: Narrow gray-tinged band across the breast, rectrices r1–r5 uniformly light brown. *Coeligena v. osculans:* Forehead emerald green, rectrix r1 dark beige base to center, center to tip grayish green; r2–r5 light brown. *Coeligena v. dichroua:* Forehead emerald green but lighter and more shiny gold than in *C. v. osculans*, rectrices r1–r5 uniform beige, distally grayish tips.

Measurements. Mensural data and body masses of all four *Coeligena violifer* subspecies are sum-

marized in Table 1. In most cases mensural data show statistically significant differences (Table 2), except for bill and wing between *Coeligena v. violifer* and *Coeligena v. albicaudata*, in wing between *Coeligena v. osculans* and *Coeligena v. albicaudata*, and between *Coeligena v. violifer* and *Coeligena v. osculans*. Apart from these exceptions, there is a trend toward bill and wing size increase in central and N Peruvian populations. Whether these differences are clinal requires verification of present distributional gaps.

Life history

Coeligena violifer albicaudata inhabits the understory of elfin forests at 2250–3600 m. This elevational range agrees with the altitudinal distribution of its other Peruvian conspecifics. The nominate race, however, has been found much lower (1300 m in primary forest, Carrasco, Bolivia; Herzog, pers. comm.). Stolzmann (1884) observed temporal elevational separation of sexes in *C. v. dichroua* (Cutervo, Tamiapampa). According to his studies, males outnumber females from October to December in mountain ranges of 1700 m at Tambillo, whereas females are most numerous at 3000 m at Cutervo and Tamiapampa (Stolzmann 1884). Information on seasonal altitudinal migration is not available for *C. v. albicaudata*.

Information on the reproductive cycle of *Coeligena violifer* is lacking. However, judging from gonad development data indicated on specimen labels of adult birds from the Cordillera Vilcabamba collected by John S. Weske and John W. Terborgh, onset of the reproductive period occurs in July–August.

General remarks

The Apurímac river basin has been interpreted as a major geographic barrier separating the Cordillera Vilcabamba from the main central Andean massif (e.g., Vuilleumier 1969, Weske 1985). This inference is supported by distributional limits of some species and subspecies, e.g., *Otus marshalli* and *Coeligena torquata eisenmanni* (Weske & Terborgh 1981, Weske 1985). However, that the Apurímac river basin is not a barrier in the case

FIG. 1. *Coeligena violifer albicaudata*, subsp. nov., from the Apurímac region, Peru; male (hovering) and female (perching). From a color plate by David Alker.

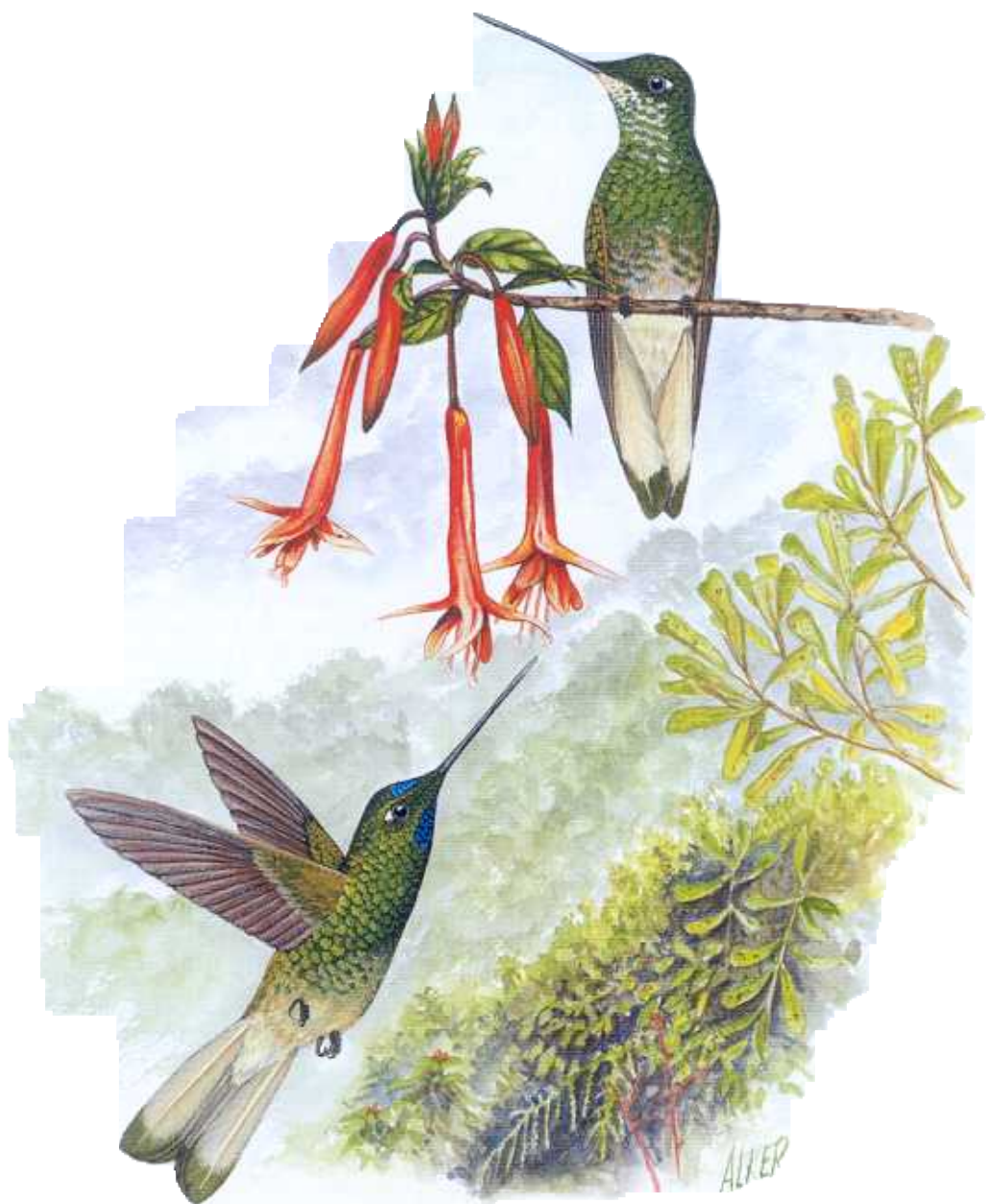


TABLE 1. Mensural characteristics and body masses [mean, sample size (n), \pm SD] of all four *Coeligena violifer* subspecies.

Taxon	Sex	Bill mm	Range mm	Wing mm	Range mm	Tail r5 mm	Range mm	Fork r5-r1 mm	Range mm	Body mass g**
<i>dichroura</i>	m	42.1 (8) \pm 1.8	39.5-44.8	83.6 (8) \pm 1.8	81.0-86.0	53.1 (8) \pm 2.7	50.0-57.0	8.0 (7) \pm 2.1	4.0-10.0	9.2 (69) ¹ \pm 0.6
	f	40.3 (3) \pm 0.8	39.5-41.1	75.0 (3) \pm 5.0	70.0-80.0	48.0 (3) \pm 1.0	47.0-49.0	6.0 (2) -	-	7.9 (56) ¹ \pm 0.5
<i>albicaudata</i>		36.6*(12) \pm 1.6	36.2-41.2	78.7*(12) \pm 1.8	76.0-81.0	52.7*(12) \pm 1.6	50.0-55.0	8.9*(12) \pm 2.3	6.0-12.0	7.6 (3) ad. 7.5 immat. ¹
	f	40.9*(7) \pm 1.4	39.4-43.2	70.2*(7) \pm 1.7	67.0-72.0	45.0*(7) \pm 1.9	42.0-48.0	5.2*(6) \pm 2.3	3.0-8.0	6.8 immat. ¹
<i>osculans</i>	m	39.7*(8) \pm 1.0	38.0-40.6	78.2*(8) \pm 1.5	76.0-80.0	51.4 (8) \pm 1.1	50.0-53.0	8.0 (8) \pm 2.5	5.0-11.0	7.6 ¹ (14) \pm 0.6
	f	42.1*(4) \pm 2.4	39.8-44.6	72.0*(4) \pm 1.0	71.0-73.0	47.3 (4) \pm 1.5	46.0-49.0	6.0 (4) \pm 1.0	5.0-7.0	6.6 ¹ (14) \pm 0.5
<i>violifer</i>	m	38.1 (14) \pm 1.5	35.9-40.4	78.4 (13) \pm 1.7	76.0-81.0	50.8 (15) \pm 2.8	45.0-56.0	9.9 (15) \pm 1.6	8.0-13.0	7.8*(65) \pm 0.3
	f	40.0 (2) \pm 1.2	39.1-40.8	69.3 (3) \pm 1.2	68.0-70.0	41.5 (2) \pm 2.1	40.0-43.0	5.0 (2) \pm 1.4	4.0-6.0	7.0*(37) \pm 0.5

* Significant at $P < 0.01$ (two-tailed t-test) between sexes (when sample size $n > 3$). ** Significantly different (ANOVA, $F_{5, 218}$; $P < < 0.001$), ¹ Data from labels and living birds.

of *Coeligena violifer albicaudata* is indicated by its occurrence on both sides of the valley. Locality data from Ampay suggest circumferential distribution around the upper Apurímac (Fig. 2).

The occurrence of *Coeligena violifer dichroura* in the extreme W Andes of Peru is remarkable and difficult to explain (Fig. 2; Dept. Lima, Koepcke 1970). The presence of this subspecies there may reflect its status as an isolated relict population or may simply indicate a lack of distributional knowledge.

One may postulate a possible evolutionary history for *Coeligena violifer*, in which there is a progressive change in plumage characters in time and space. A brown-tailed precursor may have entered the Andes in NE Peru, and then gave rise to the green-golden and chestnut-tailed *C. v. dichroura*. Dispersing south, the white-tailed *C. v. albicaudata* evolved in the Apurímac region, whereas the S Peruvian taxon *osculans*, similar in external morphology to *dichroura*, may be the result of a typical Andean "leapfrog" pattern (Remsen 1984) in which plesiomorphic coloration was retained. The N Bolivian nominate form is the most derived subspecies, with strongly contrasting underparts (narrow white band on blue-green breast against chestnut belly).

Elliot (1874) questioned the validity of *Coeligena violifer dichroura*, which had been given species rank originally (Taczanowski 1874) on the basis of only minor differences in tail and throat patch coloration. He considered this northern population to be taxonomically identical to *Coeligena [violifer] osculans*. According to our analysis, the subspecific status of *dichroura* and *osculans* is supported, not only by phenotypical characteristics, but also by statistically significant differences in body mass, wing, and bill length (Table 1, 2). The newly described taxon *albicaudata* separates S Peruvian *osculans* biogeographically from central and N Peruvian *dichroura*, thus closing a distributional gap.

RESUMEN

Se describe una subespecie nueva de *Coeligena violifer* de los Andes del Perú meridional. El holotipo está depositado en la colección del American Museum of Natural History, Nueva York. Se describe la variación geográfica en *C. violifer*.

TABLE 2. Comparison of wing and bill length in male *Coeligena violifer* subspecies (two-tailed t-test).

Wing \ Bill	<i>dichroura</i>	<i>albicaudata</i>	<i>osculans</i>	<i>violifer</i>
<i>dichroura</i>	—	< 0.01	< 0.01	< 0.01
<i>albicaudata</i>	< 0.01	—	> 0.05	> 0.05
<i>osculans</i>	< 0.05	< 0.05	—	> 0.05
<i>violifer</i>	< 0.01	> 0.05	< 0.05	—

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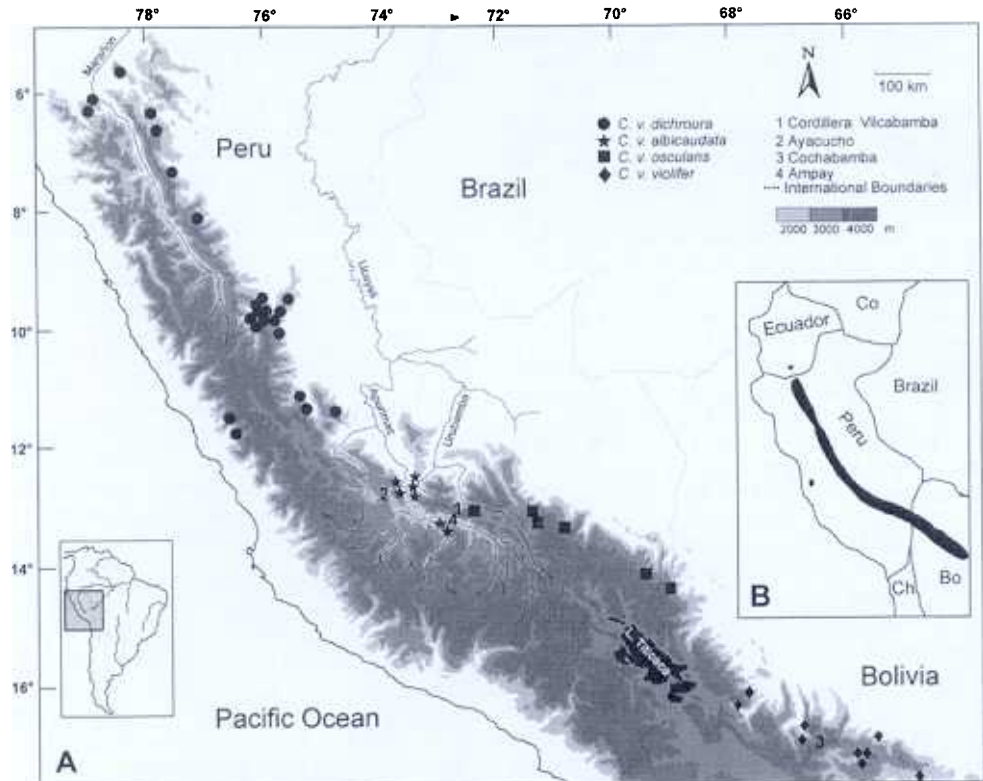


FIG. 2. A — Distributional records of *Coeligena violifer* subspecies (*dichroura*; *albicaudata*, subsp. nov.; *osculans*; *violifer*). B — Distribution pattern of *Coeligena violifer*. For locality details see Appendix.

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APPENDIX

Specimens examined

Coeligena violifer albicaudata, subsp. nov., Peru: Ayacucho, Puncu, ca. 30 km NE of Tambo, 12°47'S, 73°49'W, 3370 m: 2 LSUMZ, 3 AMNH; Ayacucho, Uchuy Monte, 12°49'S, 73°50'W, 3600 m: 2 AMNH; Cuzco, Cordillera Vilcabamba, 12°36'S, 73°31'W, 2830–3525 m: 15 AMNH; Apurímac, NE Nevado Ampay, 13°35'S, 72°55'W, 3500 m: 2 ZMUC; Apurímac, Bosque Abancay, 13°38'S, 72°57'W, 3400 m: 2 ZMUC.

Coeligena violifer violifer (Gould 1846), Bolivia: Cochabamba, 15 km N of Monte Puncu, Prov. Totora, 17°42'S, 65°09'W, 1700 m: 3 AMNH; Cocapata, 16°57'S, 66°43'W, 2200 m: 1 AMNH; Sillutincara, 16°17'S, 67°54'W, 3050 m: 2 AMNH; Incachaca, Cochabamba, 17°14'S, 65°49'W, 2800 m: 6 ZFMK; Ceja de Juno, Cochabamba, 17°18'S, 65°44'W, 3000 m: 5 ZFMK; Yungas de Cochabamba, 17°15'S, 65°55'W, 2900 m: 1 ZMUC Additional data on distribution: Santa Cruz, Comarapa, 30 km W, 17°54'S, 64°29'W, 2500 m, FMNH; Yungas de Palmar, Cochabamba, 17°06'S, 65°29'W, (no altitude given in Paynter 1992), FMNH; Puyjani, Cordillera de Cocapata, Cochabamba, 16°45'S, 66°42'W, 2650–3150 m (Herzog); Parque Nacional Carrasco, Cochabamba, 17°11'S, 65°45'W, 1300–3400 m (Herzog); Siberia, Cochabamba, 17°48'S, 64°43'W, 2200–3000 m (Herzog); Huancuni, N La Paz, 15°44'S, 68°35'W, 3050 m (Fjeldsã & Krabbe 1989); Cuesta, Cucho, Yungas de Cochabamba, 17°15'S, 65°45'W, 2300 m (Fjeldsã & Krabbe 1989); Yanta Aduana, Yungas de Cochabamba, 17°15'S, 65°55'W, 3170–3600 m (Fjeldsã & Krabbe 1989); Unduavi, 16°19'S, 67°54'W, 3000 m (Zimmer 1951); Chapara, km. 104, Cochabamba, 17°24'S, 66°09'W, 2557 m, LSUMZ; Cotapata, 4.5 km WNW Chuspipata, 16°19'S, 69°51'W, 3050–3300 m, LSUMZ.

Coeligena violifer osculans (Gould 1871), Peru: Limbani, Carabaya, 14°08'S, 69°42'W, 2900 m: 2 AMNH, 1 ZFMK; Marcapata, 13°30'S, 70°55'W, 3300 m: 3 AMNH; Cuzco, Cachupata, 13°17'S, 71°22'W, 3080–3350 m: 1 AMNH; Santa Rita, Urubamba Cañon, 13°11'S, 72°30'W (no altitude given by Stephens & Traylor 1983): 1 AMNH. Additional data

on distribution: Cuzco, Ccachubamba, 11°30'S, 70°55'W, 2850 m, FMNH; Cuzco, Pillahuata, km 126 on Cosnipata highway, 13°08'S, 71°25'W, 2450–2880 m, FMNH; Cuzco, Bosque San Luis, 13°06'S, 72°25'W, 2750 m, FMNH, LSUMZ; Cuzco, 14 km NE Abra Malaga on Ollantaitambo-Quillabamba Road, 13°08'S, 72°14'W, 4025 m, LSUMZ; Puno, Valcón, 5 km NNW Quiaca, 14°26'S, 69°24'W, 3000 m, LSUMZ, Cuzco, 1 km directly below Marcapata, 13°30'S, 70°55'W, 3150 m, LSUMZ.

Coeligena violifer dichrourea (Taczanowski 1874), Peru: Junín, Maraynioc, 11°22'S, 75°24'W, 3300 m: 8 AMNH; San Pedro S of Chachapoyas, 06°41'S, 77°47'W, 2620–2860 m: 2 AMNH. Additional data on distribution: Peru: Huánuco, Hunaco Mts., 09°58'S, 76°10'W, 3200 m, FMNH; Huánuco, Panao Mts., 09°50'S, 76°02'W, 3140 m, FMNH; Huánuco, Cordillera Carpish, 09°40'S, 76°09'W, 2840 m, FMNH; Huánuco, Bosque Taprag, Acomayo region, 09°43'S, 76°04'W, 2590 m, FMNH; Huánuco, Ishancayo Ragra, Acomayo region, 09°45'S, 76°03'W, (no altitude given by Stephens & Traylor 1983), FMNH; Huánuco, Quilluacocha, Acomayo region, 09°42'S, 76°07'W, 3500 m, FMNH; Huánuco, Huancapata, Panao region, 09°50'S, 76°00'W, 2750 m, FMNH; Huánuco, Mascarron, Acomayo region, 09°54'S, 76°04'W, (no altitude given by Stephens & Traylor 1983), FMNH; Huánuco, E slope Cordillera Carpish, Carretera Central, 09°40'S, 76°09'W, 2500–3500m, LSUMZ; Huánuco, Bosque Huaylaspampa, 09°42'S, 76°02'W, 2800–3050 m, LSUMZ; Huánuco, Bosque Zapatagocha above Acomayo, 09°40'S, 76°03'W, 3080 m, LSUMZ; Huánuco, Bosque Tapra above Acomayo, 09°43'S, 76°04'W, 3000 m, LSUMZ; Huánuco, Punta de Esperanza above Acomayo, 09°43'S, 76°05'W, 3150 m, LSUMZ; Amazonas, Cordillera Colán, E La Peca, 05°35'S, 78°22'W, 3200 m, LSUMZ; La Libertad, Masua, E Tayabamba, on trail to Ongón, 08°12'S, 77°14'W, 3350 m, LSUMZ; San Martín, Monte ca 30 km NE Los Alisos, 07°32'S, 77°29'W, 3250 m, LSUMZ; Huánuco, 14 km W Panao, 09°49'S, 76°00'W, 3000 m, LSUMZ; Huánuco, Quebrada Shugush, km 30 on Huánuco-La Unión road, 09°55'S, 76°14'W, 3100 m, LSUMZ; Unchog, pass between Curubamba and Hda. Paty, NNW Acomayo, 09°38'S, 76°08'W, 3450 m, LSUMZ; Junín, Via Satipo, Chanchuleo, ca 8 km SE Calabaza, 11°16'S, 74°37'W, 3080 m, LSUMZ; Pasco, Millpo, E Tambo de Vacas on Pozuzo-Chaglla trail, 09°42'S, 75°47'W, 3450, LSUMZ; Pasco, Playa Pampa, ca 8 km NW Cushi on trail to Chaglla, 09°51'S, 75°37'W, 2100, LSUMZ; Pasco, 2 km NW Punta de Saria on Pozuzo-Chaglla trail, 09°43'S, 75°54'W, 3100, LSUMZ; 1 km E of Huánuco border on Pozuzo-Panao trail, 10°04'S, 75°37'W, 3700 m, LSUMZ; Junín, Valle de Vitoc, 11°18'S, 75°20'W, (no altitude given by Stephens &

Traylor 1983), (Taczanowski 1894). Amazonas, Tamiapampa, 06°20'S, 77°52'W, 2690 m, (Stolzmann 1884); Cajamarca, Cutervo, 06°22'S, 78°51'W, 2650 m, (Stolzmann 1884); Cajamarca, Tambillo, 06°10'S, 78°45'W, 1770 m (Stolzmann 1884); Lima, Chancay, 11°35'S, 77°16'W, above 2000 m (Koepcke 1970); Lima, Santa Eulalia, 11°53'S, 76°40'W, above 2000 m (Koepcke 1970). Ecuador: Loja, Cajanuma Divide, 04°05'S, 79°12'W, 2530 m, MCZ.

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