

Has Colombian Weasel *Mustela felipei* been overlooked in collections?

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Abstract

Colombian Weasel *Mustela felipei* is one of the least recorded carnivores of South America, and it is known from only six confirmed records. We addressed recent suggestions that it might be more widely represented in collections than is currently recognised, reflecting its similarity in appearance to Long-tailed Weasel *M. frenata*, by surveying specimens of *Mustela* weasels from South America in 26 mammal collections. We found no new Colombian Weasel specimens. Colombian Weasel specimens come from four localities in Colombia and one in Ecuador; reports from other localities lack objective verification, and we consider that such reports should not be used to define the species's known distribution range.

Keywords: Long-tailed Weasel, mammal collections, *Mustela frenata*, specimen review, survey

¿Ha sido la Comadreja colombiana *Mustela felipei* pasada por alto en colecciones?

Resumen

La Comadreja colombiana *Mustela felipei* es uno de los carnívoros menos registrados en Suramérica y sólo es conocida de seis registros corroborados. Recientemente se ha sugerido que la especie podría estar mejor representada en colecciones que lo que actualmente se reconoce, por ende intentamos resolver esta inquietud. Una revisión de ejemplares de la Comadreja de Cola larga *M. frenata* provenientes de Colombia, Ecuador y Perú ha sido recomendada con el objetivo de encontrar posibles ejemplares de la Comadreja colombiana erróneamente determinados. En el presente trabajo realizamos una evaluación de ejemplares de *Mustela* de Suramérica en 26 colecciones de mamíferos. Encontramos que ejemplares de la Comadreja colombiana provienen de cuatro localidades en Colombia y una en Ecuador y los reportes de otras localidades carecen de pruebas objetivas. No encontramos ejemplares adicionales de la Comadreja colombiana y consideramos que los registros que no pueden ser verificados objetivamente, así como sus localidades, no deberían incluirse para la definición del ámbito de distribución de la especie.

Palabras clave: colecciones de mamíferos, Comadreja de Cola larga, determinaciones erradas, evaluación de especímenes, *Mustela frenata*

Introduction

Colombian Weasel *Mustela felipei* is perhaps the rarest carnivore of South America (Schreiber *et al.* 1989), judging by its low representation in specimen collections. The potential distribution and conservation status of Colombian Weasel was considered by Burneo *et al.* (2009), Ramírez-Chaves & Mantilla-Meluk (2009) and Tirira & González-Maya (2009), and its intraspecific variation by Ramírez-Chaves & Mantilla-Meluk (2009). It has a restricted known distribution in the Andes of Colombia and Ecuador, between 1,525 and 2,700 m a.s.l., with records from only six confirmed specimens from five localities (Ramírez-Chaves & Mantilla-Meluk 2009).

Tirira & González-Maya (2009) and González-Maya *et al.* (2011) suggested that Colombian Weasel is potentially more widely represented in collections than is currently recognised, and recommended a check of Colombian, Ecuadorean and Peruvian specimens of the similar-looking Long-tailed Weasel *M. frenata* in case any were misidentified Colombian Weasels. Published statements about Colombian Weasel habitat and ecology (e.g. Burneo *et al.* 2009) contain many contradictions, because most of them are speculations not based on reliable data. Two previous published records of Colombian Weasel were found to be misidentifications of Long-tailed Weasel (Ramírez-Chaves &

Mantilla-Meluk 2009). Therefore, we reviewed identification of *Mustela* specimens from South America, including the third congener in the region, Amazon Weasel *M. africana*, in many natural history museums and collections. The aims were to clarify the number of Colombian Weasel specimens in collections, and to attempt to document more information on this poorly known carnivore's distribution.

Methods

Mustela specimens from South America in 26 collections were reviewed directly and through digital pictures. Direct examination took place in 14 collections: *Colombia:* Colección Teriológica Universidad de Antioquia (CTUA), Medellín; Museo Colegio San José (CSJ), Medellín; Colección Zoológica Universidad de Nariño (PSO-CZ), Pasto; Instituto Alexander von Humboldt (IAvH), Villa de Leyva; Instituto de Ciencias Naturales, Universidad Nacional de Colombia (ICN), Bogotá; Museo de Historia Natural-Universidad del Cauca (MHNUC), Popayán; Museo Universidad Distrital Francisco José de Caldas (MUD), Bogotá; Universidad del Valle (UV), Cali. *Ecuador:* Museo Escuela Politécnica Nacional (MEPN), Quito. *Germany:* Zoologische Staatssammlung München (ZSM), Munich. *U.K.:* Natural History Museum (BMNH), London. *U.S.A.:* Museum of Comparative Zoology, Harvard University (MCZ),

Boston. *Peru*: Museo Universidad San Marcos (MUSM), Lima. *Venezuela*: Colección de Vertebrados, Universidad de los Andes (CVULA), Mérida. At the American Museum of Natural History (AMNH), New York, U.S.A, only one specimen was examined, that which was already identified as Colombian Weasel.

Additionally, we searched for records of *Mustela* from South America in the MaNIS (2011) and GBIF (2011) portals. We checked if the specimens had been published before and evaluated the morphological description given in the publications; if we found no evidence that the specimens had been published previously, we viewed pictures (when possible) to identify them to species. External and cranial morphology differs sufficiently between Amazon, Colombian and Long-tailed Weasels for digital pictures to allow firm identification. Specimens reviewed using pictures are housed in 11 collections: Museo de Historia Natural, Universidad de Caldas (MHNUCa) in *Colombia*; United States National Museum in the Smithsonian Institution (USNM), Los Angeles County Museum (LACM), Louisiana State University Museum of Natural Science (LSUMZ), Museum of Vertebrate Zoology at Berkeley (MVZ), Slater Museum of Natural History at the University of Puget Sound (PSM), Santa Barbara Museum of Natural History (SBMNH) and Donald R. Dickey Bird and Mammal Collection at the University of California, Los Angeles (UCLA) in *U.S.A.*; Estación Biológica Doñana (EBD) in *Spain*; Uppsala Universitets Zoologiska Museum (EM), Göteborgs Naturhistoriska Museum (GNM) and Naturhistoriska Riksmuseet (NRM) in *Sweden*.

Identifications were based on diagnostic characters available in the description of Colombian Weasel (Izor & de la Torre 1978) and direct comparisons with Long-tailed and Amazon Weasels.

Results

Collections survey

We reviewed 198 specimens of the genus *Mustela* from Brazil, Colombia, Ecuador, Peru and Venezuela housed in 26 collections, 169 directly and 29 by digital pictures. Of these, 187 were Long-tailed Weasels, six were Amazon Weasels and four were Colombian Weasels. All four Colombian Weasel specimens (three in Colombian collections and one in AMNH) were reported previously as this species (Schreiber *et al.* 1989, Alberico 1994, Ramírez-Chaves & Mantilla-Meluk 2009). MEPN, Ecuador, has been suggested to hold at least one Colombian Weasel specimen (without accession number: Albuja & Rageot 2005, Burneo *et al.* 2009), but only specimens of Amazon and Long-tailed Weasels were found at this collection. Based on the morphological and morphometric characteristics given by Albuja & Rageot (2005), the specimen reported as Colombian Weasel is a misidentification of a Long-tailed Weasel (Ramírez-Chaves & Mantilla-Meluk 2009). The records of Amazon Weasel reviewed from Brazil (MCZ 30802), Ecuador (MCZ 36324) and Peru (USNM 255119) were also reported previously (Hall 1951, Izor & de la Torre 1979, Izor & Peterson 1985). Of the three species, Long-tailed Weasel was the most represented in the collections with 187 South American records from Bolivia, Colombia, Ecuador, Peru and Venezuela. No specimens of Colombian Weasel misidentified as other species were found.

Data portals

We found a total of 189 South American *Mustela* specimens in MaNIS (2011) and 355 records (254 specimens, 101 records based solely on observations) in GBIF (2011). Only 26 of the specimens reviewed directly by us appear to be registered in these databases.

Mustela felipei – In MaNIS (2011), three specimens are identified as Colombian Weasel (two from Colombia and one from Ecuador). In GBIF (2011), we found 31 records (all from Colombia) but only four have voucher specimens. The other 27 records (from the Department of Antioquia, Colombia) are based on Restrepo Llano *et al.* (2010) and constitute uncorroborated observations in unpublished technical reports. The validity of these records cannot be assessed, because no evidence for identification is provided. The three specimens found in both MaNIS (2011) and GBIF (2011) are well known (Field Museum [FMNH], Chicago, U.S.A: FMNH 70999 Holotype, FMNH 86745 Paratype (Izor & de la Torre 1978); and AMNH 63839). The additional specimen in GBIF (2011), IAvH 7434, is also well known (Ramírez-Chaves & Mantilla-Meluk 2009). A specimen from Colombia (Department of Cauca, Munchique; NRM 580210) appears in GBIF (2011) identified as Colombian Weasel, but the pictures clearly show it to be a Long-tailed Weasel, as previously identified in Hall (1951).

Mustela africana – Seven specimens identified as Amazon Weasel in MaNIS (2011) are from Brazil (three), Ecuador (one) and Peru (three); the same specimens were found in GBIF (2011), plus two without locality. Although few Amazon Weasel specimens are in the databases, approximately 30 specimens were known to Schreiber *et al.* (1989). Of the seven specimens with locality data in MaNIS (2011) and GBIF (2011), we reviewed three. All seven were reviewed and corroborated previously by other authors: FMNH 106488 from Amazonas, Río Juruá, Cruzeiro do Sul, Brazil; MCZ 30802 from Río Tocantins, Cameta, Brazil; MCZ 36324 from Oriente, río Tatún Yacu, Ecuador; and AMNH 61813 from Junín, Chanchamayo, Valle del Perene, 1,200 m, Peru, were all reviewed by Izor & de la Torre (1978); USNM 255119 from Chanchamayo, Peru, and AMNH 98552 from Loreto, Peru, were reviewed by Izor & Peterson (1985); and AMNH 37475 from Pará, Brazil, was reviewed by Allen (1916a). Of the two specimens without locality in GBIF (2011), one (EBD 28055, skull only, without data), lacks the cranial characteristics of Amazon Weasel, but it is impossible to know if it is Long-tailed Weasel or a weasel from outside the Americas. The second one (NRM 584892) was not reviewed by us and its identification needs to be corroborated.

Mustela frenata – In MaNIS (2011), 174 specimens appear identified as Long-tailed Weasel (Bolivia 6, Colombia 57, Ecuador 33, Peru 31 and Venezuela 47). GBIF (2011) gave a total of 238 specimens, from Bolivia (6), Colombia (93), Ecuador (55), Peru (34) and Venezuela (50). Sixty-eight of these specimens still need corroboration: four from Bolivia, 29 from Colombia, 13 from Ecuador, nine from Peru and 13 from Venezuela. The rest were previously reviewed by Lönnberg (1913), Hollister (1914), Allen (1916a, 1916b), Hall (1935, 1938, 1951), Izor & de la Torre (1978), Anderson (1997), Voss (2003) and Ramírez-Chaves & Mantilla-Meluk (2009), and sufficient detail of their morphology including morphometrics is included in those sources to be confident that none shows the diagnostic characteristics of Colombian Weasel.

Discussion

Morphology

Externally and cranially Colombian Weasel differs sufficiently from Long-tailed Weasel for confusion over specimen identification to be unlikely (see Izor & de la Torre 1978, Ramírez-Chaves & Mantilla-Meluk 2009), despite the suggestion of Tirira & González-Maya (2009) that both species look similar. Colombian Weasel has inflated auditory bullae posteromedially and its mesopterygoid fossa is wide; both characters differentiate it from Long-tailed and Amazon Weasels (Izor & de la Torre 1978). Externally the soles of the feet of Colombian Weasel lack fur, in contrast to those of Long-tailed and Amazon Weasels (Izor & de la Torre 1978, Ramírez-Chaves & Mantilla-Meluk 2009). Two other external characters differentiate Colombian Weasel from Long-tailed Weasel: its ventral oval mark concolorous with the dorsum, and its short tail without a terminal black tip. Long-tailed Weasel has a black tail-tip; both Amazon and Colombian Weasels lack this. Amazon Weasel is larger than Colombian Weasel and its dark ventral stripe extends until close to the neck (Izor & de la Torre 1978). These are not features, however, that allow ready separation on field views, and reports not based on specimens may be at high risk of misidentification.

Misidentified specimens

We found no Colombian Weasels misidentified as Long-tailed or Amazon Weasels. This does not support the idea that Colombian Weasel is potentially more numerous in collections than is currently recognised. Review of collections was intensive enough to indicate that the possibility of finding a new specimen in existing mammal collections is low, especially from Colombia where of 90 specimens of *Mustela* reviewed, only three belong to Colombian Weasel. Future research priorities should focus on field work, as already urged by Tirira & González-Maya (2009).

Although 68 specimens identified as Long-tailed Weasels in the data portals were not corroborated, their misidentification seems very unlikely, at least in the U.S.A. (52 of these 68 specimens are deposited in the AMNH, FMNH and USNM), where carnivore curatorial work is well developed (e.g., Izor & de la Torre 1978). A total of 191 *Mustela* specimens from South America in several museums of Europe and the U.S.A. were identified as Amazon Weasel (nine specimens) and Long-tailed Weasel (182) by Hall (1951: 401) who noted a probably “unnamed race” of Long-tailed Weasel that is “dark colored and has the color of the underparts so much restricted as to suggest that it belongs to the race *aureoventris*”, collected in Baeza, Ecuador. The specimen in question (AMNH 63839) has already been found to be a Colombian Weasel (Schreiber *et al.* 1989, Ramírez-Chaves & Mantilla-Meluk 2009). Given that Hall (1951) noticed this specimen, and mentioned no more of similar description, it seems highly unlikely that presently misidentified Colombian Weasel specimens lie among those that Hall (1951) reviewed.

Locality records of Colombian Weasel

Only five localities are confirmed for Colombian Weasel (Fig. 1), four in Colombia and one in Ecuador (Ramírez-Chaves & Mantilla-Meluk 2009). Other recent sources have given different numbers. Emmons & Helgen (2008) stated that Colombian Weasel was known from ten localities, but listed only three

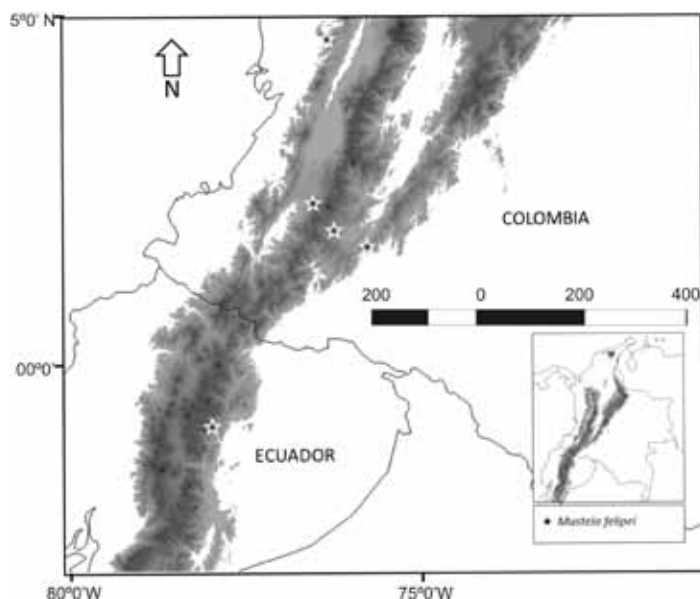


Fig. 1. Verified records of Colombian Weasel *Mustela felipei* across its world distribution. The species is only known from five localities. Elevations along the Andes that range between 1,000 and 3,000 m a.s.l. are shaded light grey and those higher than 3,000 m a.s.l. are dark grey.

and did not consider the record from Alto de Galapagos (Alberico 1994; on the limits between the Departments of Valle del Cauca and Chocó in the Cordillera Occidental of Colombia) in their map of the species's distribution.

Burneo *et al.* (2009) listed Colombian Weasel as unconfirmed at five localities in Colombia. They stated that presence at Cueva de los Guacharos (Department of Huila, Colombia) was not validated by a specimen, but this locality is confirmed by specimen IAvH 7434 (Schreiber *et al.* 1989, Ramírez-Chaves & Mantilla-Meluk 2009). The other four such localities, Chivatá-Boyacá, Santa Rosa de Cabal-Risaralda, Almaguer and Munchique-Cauca, do indeed seem to lack any voucher specimen or other objective evidence. Munchique was based on Casas (2007), yet the original source itself stressed that the presence of the named mammals must be verified because the information was not based on field work. Chivatá-Boyacá came from Bernal (2004), a source containing many obvious mistakes, and for which all species were apparently identified through field observation, yet it includes various rodent and bat species that cannot be identified with certainty under such conditions. These two seem particularly likely to be in error. Two localities from Ecuador in Burneo *et al.* (2009), Valle de Tumbaco and Mera, are based on misidentifications of Long-tailed Weasel. The confusion over the purported MEPN specimen from Valle de Tumbaco is discussed above, and presence in Mera is based on Rageot & Albuja (1994) where, however, the only species of *Mustela* included is *M. frenata*; *M. felipei* is not mentioned.

Burneo *et al.* (2009) and Tirira & González-Maya (2009) cited Schreiber *et al.* (1989) as the source of the *M. felipei* record from Valle de Tumbaco, Ecuador, with a specimen in MEPN; but Schreiber *et al.* (1989) referred to specimen AMNH 63839 from Napo, Baeza, and the specimen in MEPN was mentioned in Albuja & Rageot (2005). Additionally, Tirira & González-Maya (2009) omitted the above-mentioned record from Cueva de Los Guacharos. As was discussed above, there

seem to be no specimens of Colombian Weasel at MEPN. This means that the only confirmed record from Ecuador is AMNH 63839 (Ramírez-Chaves & Mantilla-Meluk 2009).

The overall reliability of an occurrence dataset is associated with the reliability of each record. The use of “observations that lack conclusive physical evidence . . . to establish the presence or geographic range of rare species is inherently unreliable and can lead to errors with substantial negative impacts on conservation decision making and resulting conservation efforts” (McKelvey *et al.* 2008: 549). For this reason, records of *M. felipei* that lack evidence to allow their objective review should not be accepted unless evidence of their validity can be found. Given the great paucity of records of this weasel, such evidence when not given should be actively sought because, for various reasons, it may exist but be omitted from survey reports. However, some records highly likely to be in error have already been used to define and model the distribution of Colombian Weasel in some sources (see above), which may well have led to misleading conclusions.

In conclusion, marked diagnostic cranial and external characteristics of Colombian Weasel specimens preclude confusion of specimens with the other South America *Mustela* species. Consistent with this, the present review finds no evidence that Colombian Weasel is underreported through misidentification of specimens in mammal collections. Field records of Colombian Weasel should be accepted only where identification is objectively verifiable by reliable evidence such as photographs or videos showing diagnostic characters, diagnostic DNA evidence, or live or dead specimens (see McKelvey *et al.* 2008).

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Appendix 1. Specimens of South American weasels *Mustela* reviewed.

Acronyms are expanded in the text. *Photographs reviewed.

***Mustela africana* : BRAZIL:** MCZ 30802, Rio Tocantins, Cameta. BMNH 26.1.8.10, Pará, Monotucú, Capinsal. BMNH 5.1.25.1, Pará, Dominha. **ECUADOR:** MCZ 36324, Oriente, Rio Tatu Yacu. **PERU:** BMNH 24.12.12.24, Moyobamba. USNM 255119*, Chanchamayo.

***Mustela felipei* : COLOMBIA:** IAvH 7434, Huila, Palestina, P.N.N. Cueva de Los Guacharos, valle del río Suaza. UV 7483. Límite departamentos Valle del Cauca y Chocó; Alto de Galápagos, cordillera Occidental. ICN 19131, no specific locality. **ECUADOR:** AMNH 63839, Napo, Baeza, arriba.

***Mustela frenata* : COLOMBIA:** ANTIOQUIA: ICN 8754, Venecia, Finca El Esiderio. CTUA collector number DMC 85, Municipio de Guarne, Vereda Piedras Blancas. BMNH 76.8.8.10, Medellín. BMNH 76.8.8.11, Medellín. CSJ 238, 384, 397, 419 Medellín, Santa Elena. BMNH 21.7.1.8, Jericó, near to Cauca River. BMNH 98.10.3.3, Valdivia. BOYACÁ: IAvH 7214, Venta Quemada, sitio Alto de Venta Quemada. ICN 267, 1929, Soatá. CALDAS: MHNUCa 247*, Municipio Neira, vereda Caldas. MHNUCa 418*, Manizales, morro Sancancio. MHNUCa 1105*, Villamaría, Parque Nacional Natural Los Nevados, Santa Isabel. ICN 15164, Manizales, Sitio La Elvira, Reserva Río Blanco. ICN 15165, Manizales, Sitio Bocatoma Olivares, reserva Río Blanco. ICN 16733, Manizales, río Blanco. CAUCA: NRM 580210*, Munchique, El Tambo. LACM 056413*, Las Guacas. MHNUC 57E, Popayán, Cajete. MHNUC 58E, Popayán. MHNUC 84, Popayán. MHNUC 86, Popayán. ICN 9926, El Tambo. ICN 9927, El Tambo, Munchique. ICN 9928, El Tambo. BMNH without number, 20 miles NE of Quilichao. CHOCÓ: UV 10127, San José del Palmar. CUNDINAMARCA: MVZ 104950*, Department boundary, NE Villa-Pinzón. MVZ 114428*, Cañon de Las Catedras, 4 km SW Mosquera. IAvH 1231, Bogotá, Parque La Florida. ICN 1925, Bogotá, Ciudad Universitaria. ICN 3507, Bogotá, Sabana de Bogotá. ICN 8734, Bogotá, barrio Meisen. ICN 3824, Carretera entre Fontibon y el aeropuerto El Dorado. ICN 3825, cerca de Zipaquirá. ICN 1053, Cajicá. ICN 266, Funza. ICN 11017, Junín, Reserva Biológica Carpanta. ICN 12890, La Vega, Vereda Sabaneta, finca La Rosita, al pie de la escuela. ICN 12992, La Vega, Vereda Rosario, finca Llano de Primavera, cerca a río Tabacal. ICN 803, Sopó, río Teusaca. ICN 13681, Subachoque, Vereda La Cuesta, finca El Roble. ICN 4435, Tenjo. MCZ 27561, Fusagasugá. MCZ 27194, Fusagasugá. MCZ 27195, Guasca. MCZ 19859, Laguna del Verjon. MCZ 27560, Choachí. MCZ 20103, Choachí. BMNH 98.11.7.6, Castillo, Bogotá. BMNH 95.8.1.13, Zambrias, N. Bogotá. BMNH 54.1.11.3, Bogotá. BMNH 98.11.7.5. HUILA: IAvH 1591, Acevedo, P.N.N. Cueva de Los Guacharos. IAvH 5748, Pitalito, vereda Palestina. MAGDALENA: IAvH 1650, IAvH 1777, IAvH 1826, Sierra Nevada de Santa Marta, cerro de San Lorenzo. NARIÑO: PSO-CZ RNL P 389, Reserva La Planada, Finca Santa Rosa. PSO-CZ RNL P 376, Reserva La Planada. PSO-CZ RNL P 382, Reserva La Planada. NORTE DE SANTANDER: ICN 10985, Arboledas, vereda Cinera, finca La Palmita. RISARALDA: IAvH 5749, P.N.N. Ucumarí, entre El Cedral y El Ceilán. TOLIMA: CTUA collector number DMC 227, Cajamarca. VALLE DEL CAUCA: UV 11480, Vereda La Olga, Yumbo, 1,850 m. UV 4898, 4899 Río Raposo, Buenaventura. UV 9920, Pichindé, Cali. UV 7126, 7127, 7130, 7131, 7132, Candelaria. UV 10179, Obando. UV 6801, Buga. UV 7128, El Carmelo, Candelaria. UV 7129, El Carmelo, Candelaria. UV 2325, 4114, Campus Uni, Melendez, Cali. UV 4321, Laguna de Sonso, Municipio Guacarí. UV 11964, Vereda La Lloreda, Corregimiento Galicia, Municipio Buenaventura. UV 12188, CIAT, Palmira. UV 13816, KM 10, Carretera Buga - Buenaventura. IAvH 913, Ex-colección del departamento de Biología. IAvH 914, Jamundí. IAvH 746, Carretera Sylvania, El Soche. COLOMBIA: BMNH 45.9.18.14. CSJ 043, 044. **ECUADOR:** USNM 548396*, Pastaza, Mera, cerca al río Pastaza. SBMNH 8949*, Pichincha, Guapalo Valley; Cumbaya Stream, near San Pedro River. PSM 14337*, Oriente. MCZ 52664, Pallatanga. MCZ 52700, Occidente, Calacali. MCZ 52730, Cotopaxí, Latacunga. MCZ 38689, MCZ 38690, Tunguragua Province, Lamos (Baños). BMNH 97.11.7.29, Ibarra. BMNH 99.2.18.10, BMNH 99.2.18.11, BMNH 99.2.18.12, BMNH 99.2.18.8, BMNH 99.2.18.9, Quito. BMNH 34.9.10.89, BMNH 34.9.10.91, San Antonio, 15 miles W. of Quito. BMNH 14.4.25.13, BMNH 14.4.25.14, 3°04'S, 78°50'W. BMNH 54.640 Cerro de Tuga. BMNH 99.99.7, Cañas. BMNH 97.11.7.30. BMNH 14.4.25.15. GNM-Ma.ex. 1645* and skull: GNM-Coll.an. 17834, Guapulo, near River Machangara, 8,500 feet. GNM-Ma.ex. 1646* and skull: GNM-Coll.an. 17835, Guapulo, near River Machangara, 8,500 feet. GNM-Ma.ex. 1647* and skull: GNM-Coll.an. 17836, Pichincha, above Quito, 10,000 feet. GNM-Ma.ex. 1648* (skull missing), "Carapungo", 6.5 miles N of Quito, 8,400 feet. GNM-Ma.ex. 1649* and skull: GNM-Coll.an. 17838, Santo Domingo de los Colorados, 1,625 feet. GNM-Ma.ex. 1650* (no skull), near Mindo, W. side Pichincha, 5,000 feet. **PERU:** LSUMZ 18449*, Farmland above Acomayo. LSUMZ 26888*: 'Batan' on Zapalache-Carmen trail. LSUMZ 28013*, LSUMZ 28014*, Unchog, pass between Churrubamba and Hda. Paty, NNW Acomayo. LSUMZ 28029*, Base of Bosque Zapatochocha above (NE) Acomayo. MVZ 114773*, MVZ 139614*, MVZ 139615*, Depto. Puno, Hacienda Calacala, 7 mi SW Putina. EM 46256*, Organero, East Andes. MCZ 41057 Manayioc (Maraynioc), 45 miles northeast of Tarma. MCZ 17040, MCZ 17041, Huancabamba. MCZ 13257, Guadichiri. MUSM 4332, Cajamarca, Jaen. MUSM 2121, Huanuco. MUSM 2120, Puno, Ollachea. MUSM 2119, Huánuco, Acomayo. MUSM 2117, Puno, Chacayani. MUSM 12991, Junín, Cordillera. MUSM 12990, Cusco, Cordillera de Vilcabamba. MUSM 7209, San Martín. MUSM 8746, Cusco, Paucartambo. MUSM 21705, Portachuel, Piura. MUSM 1611, Lima. BMNH 8.1.10.1, Lima. BMNH 26.5.3.8, Celendin. BMNH 22.1.1.18, Ollantaytambo. BMNH 26.5.3.9, Condechaca. BMNH 98.11.6.7, Cuzco, Ocobamba. BMNH 26.2.12, Yanamayo. MUSM 2239. MUSM 2123. MUSM 2122. MUSM 5087. **VENEZUELA:** EBD_CSIC 11301*, Caracas, Los Teques, Miranda. UCLA 19334*, Mérida, Montes del Valle. CVULA 1212, Trujillo, Boconó. CVULA 878, Distrito Federal, El Junquito. BMNH 98.7.1.9, Milla. BMNH 14.7.27.2, Cerro del Aguila. CVULA 188, Mérida, Alrededores de Mérida. CVULA 831 Mérida, Monte Zerpa 6 Km N Mérida. CVULA 832, Mérida, El Salado 5 Km N de Ejido. CVULA 833, Mérida, EL Joque, 3 Km NE de Jají. CVULA 998, Mérida, El Mostrenco, 4 Km S de Santo Domingo. CVULA 1019, Mérida, 4 Km N Chachopo. CVULA 1213, Mérida, Urbanización La Mata (La Parroquia). CVULA 1214, Mérida, La Matica de La Rosa-San Rafael de Mucuchies. CVULA 1322, Mérida, 2 Km NE de Apartaderos. CVULA 1497, Mérida, Manzano Alto, 14 Km WSW de Mérida. CVULA 2527, Mérida, Páramo La Negra. CVULA 2962, 4399, Mérida, San Rafael de Tabay, 3 Km NE Tabay. CVULA 7024, Mérida, 200 m arriba de La Gran Parada, La Pedregosa. CVULA 7028, 7145, Mérida, Chorros de Milla. CVULA 7144, Mérida, Cacute 5.5 Km SW Mucuruba. CVULA 1292, BMNH 27.11.19.41, BMNH 2.7.28.1, BMNH 98.7.1.8, BMNH 2.7.28.2, ZSM 1925/415, Mérida. BMNH 26.11.4.4. **NO SPECIFIC LOCALITY:** BMNH 34.9.10.92.