

IDENTIFICATION AND DISTRIBUTION OF THE RECENT SLOTHS OF BRAZIL (EDENTATA)¹

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The identity and nomenclature of the living species of sloths, even those of the type species of the three-toed sloth *Bradypus tridactylus* and the two-toed sloth *Choloepus didactylus*, which date from Linné (1758), receive uneven treatment from investigators. The resultant problem in communication is particularly unfortunate for scientific studies within Brazil. No other nation contains most of the species (Vicira, 1955; Cabrera, 1958) or all of the species (Wetzel & Kock, 1973; Wetzel, in press) of living sloths. Thus Brazil is premier in its position for continuing the study of the physiology, anatomy, phylogeny and ecology of these unique inhabitants of the forests of the Neotropics (see Goffart, 1971, as a status report). Preliminary estimates by Eisenberg & Thorington (1974) hold that the sloths represent the greatest mammalian biomass of the Neotropical forest ecosystems. Unfortunately, time seems limited for our understanding the sloths and reaping benefits that comparative studies might make to the biomedical and conservation fields. After deforestation forests may return by seedlings and sprouting from roots, albeit often less rich and varied due to erosion, leaching and impactment of soils. But sloths cannot return unless a sufficiently large, peripheral population remains. Already the future of one species, the named sloth *Bradypus torquatus* Illiger of the coastal forests of

southeastern Brazil, is endangered (Coimbra-Filho, 1972).

Toward improving communication among investigators of varied aspects of the biology, evolution and conservation of sloths and, hopefully, encouraging more such studies, we present here a guide to the identification of the sloths of Brazil. The names that we assign to the specimens in reference collections we have visited in Brazil are listed in some detail. We feel this to be essential for future use of these important reference resources by scientists within Brazil, as well as by investigators visiting from other nations.

The specimen numbers are those found on the specimens during visits to the museums dating back to 1969. Where the host museums had not assigned their own catalogue numbers to the specimen labels, we have noted the source of the other number in parentheses. Thus certain specimens at the Museu Paraense "Emílio Goeldi" will have "(G. Hagemann)" following the number when Hagemann's collection number is the only means of designating the specimen. Or, specimens that have been donated by one museum to another may still be identified by the number of the original collection; thus specimens in one museum may have a different museum symbol in parentheses.

In addition to listing the sloths in Brazilian collections, we have listed specimens from certain museums outside of Brazil. These include pertinent holotypes we have examined and certain

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other specimens which we present for their historical interest. The latter were collected in Brazil by either Professor Emílio Goeldi and are on deposit in the Naturhistorisches Museum in Bern, Switzerland, or by Sr. G. Hagmann, Prof. Goeldi's colleague and collector in Pará, and are on deposit in the Musée Zoologique de l'Université et de la Ville, Strasbourg, France.

Where possible, localities in Brazil are in the form and spelling used by Vanzolini & Papavero (1968). When this differs from the specimen label, the latter is indicated in parentheses. The species arrangement, synonymies and ranges follow Wetzel & Kock (1973) and Wetzel (in press). The only synonymies presented are those names used as senior synonyms by Vieira (1955) or by Cabrera (1958).

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AMNH – American Museum of Natural History, New York; S. Anderson, R. Van Gelder.

BMNH – British Museum (Natural History), London; G.B. Corbet, I.R. Bishop.

FZB – Fundação Zoobotânica, R.G. Sul, Porto Alegre; C. de Paula Couto e Tania M. S. Santos

INPA – Instituto Nacional de Pesquisas da Amazônia, Manaus; A.C. Maranhão, Nina, F. Barbosa de Almeida.

MN – Museu Nacional, Universidade Federal do Rio de Janeiro.

MPEG – Museu Paraense "Emílio Goeldi," Belém; F.C. Novaes.

MZUSP – Museu de Zoologia da Universidade de São Paulo; P.J. Vanzolini.

MZUV – Musée Zoologique de l'Université et de la Ville, Strasbourg; F. Gouin.

NMBE – Naturhistorisches Museum Bern; P. Lüps.

MRMS – Naturhistoriska Riksmuseet, Stockholm; Ulf Bergström (deceased); G. Vestergren.

PNI – Parque Nacional do Itatiaia, Itatiaia, R.J.; Elio Gouvêa.

SMF – Natur-Museum und Forschungsinstitut Senckenberg, Frankfurt am Main; H. Felten.

ZMB – Zoologisches Museum, Museum für

Naturkunde der Humboldt-Universität zu Berlin; R. Angermann.

ZSM - Zoologische Sammlung des Bayerischen Staates, Munich; T. Haltenorth, G. Heidemann.

FAMILY BRADYPODIDAE.

The three-toed sloths

The biphyletic origin (Patterson & Pascual, 1968; Hoffstetter, 1969) and the anatomical differences (Pocock, 1924) between the three-toed sloths, *Bradypus* L., and the two-toed sloths, *Choloepus* Illiger, necessitate following those authors in using two families for the Recent sloths.

Genus *Bradypus* Linné

Pelage with dots and blotches of pale color on darker dorsum; no black color on throat or shoulder; male with middorsal yellow to orange speculum; one pair or no foramina in anterodorsal nasopharynx; pterygoids not inflated; all teeth not distinctly compressed anteroposteriorly; mandibular spout moderately long to lacking.

1. *Bradypus tridactylus* Linné

Pale-throated three-toed sloth, ai-ai, preguiça de bentinho

Bradypus tridactylus Linné, 1758: 34; Vieira, 1955: 401 (as *B. tridactylus tridactylus*); Cabrera, 1958: 210. *Holotype*: BMNH 67.4.12.579.

Arctopithecus flaccidus Gray, 1849: 72; Gray, 1869: 365, Var. 1 *Dysoni* (*holotype*: BMNH skin 47.7.18.3, skull 49.4.13.3) and Var. 2 *Smithii* (*holotype*: BMNH skin 45.3.11.5, skull 49.5.5.2); Cabrera, 1958: 209 (as *B. infuscatus flaccidus*) in part.

Type-locality: Surinam.

Diagnosis: Throat white or yellowish buff, continuous with pale color of forehead; distinct foramina in anterodorsal nasopharynx; cranium small and mandibular spout long.

Range: Venezuela in the delta of Rio Orinoco (T.F. Amacuro), state of Bolívar, and highland portion of T.F. Amazonas, through forested Guyana, Surinam, French Guiana, and adjoining northeastern Brazil (Amapá and Pará east of Rio Negro), south to the Rio Amazonas where it is sympatric with *B. variegatus* along both

banks from Rio Negro to at least Rio Tapajós and along left bank to mouth of Amazon.

Specimens examined in Brazil: Amapá – Rio Vila Nova, Mazagão MPEG 594.

Amazonas – Lago Baptista MZUSP 5303.

Pará – Bravo (immediately north of Óbidos according to Glydenstolpe, 1951) MZUSP 5302; Faro MN 2383 (MPEG); Tiriós (Tirlós) MPEG no number.

2. *Bradypus variegatus* Schinz

Brown-throated three-toed sloth, ai-ai, preguiça, marmota

Bradypus variegatus Schinz, 1825: 510; Wetzel & Kock, 1973: 27. *Holotype*: SMF 4313.

Bradypus infuscatus Wagler, 1831: 605, 611; Vieira, 1955: 401 (as *B. tridactylus infuscatus*); Cabrera, 1958: 209. *Holotype*: ZMS 1162, confluence of Rio Içá and Rio Solimões, Amazonas, as restricted by Cabrera (ibid.).

Bradypus tridactylus brasiliensis Blainville [1840: 64, Pls. 3,4]; Vieira, 1955: 401; Cabrera, 1958: 208 (as *B. infuscatus brasiliensis*).

Arctopithecus marmoratus Gray, 1849: 71; Cabrera, 1958: 210 (as *Bradypus infuscatus marmoratus*). *Holotype*: BMNH skin 42.4.29.20, skull 49.4.13.2, Pará, as restricted by Cabrera (ibid.).

Bradypus ephippiger Philippi, 1870: 267; Cabrera, 1958: 209 (as *B. infuscatus ephippiger*).

Arctopithecus griseus Gray, 1871a: 302. *Lectotype*: BMNH 69.7.19.7, male, Panamá, Veraguas, Cordillera del Chuco (?=Chueca).

Arctopithecus boliviensis Gray, 1871b: 442; Cabrera, 1958: 208 (as *Bradypus boliviensis*). *Holotype*: BMNH skull 921a, skin 46.7.28.24, Bolivia, Santa Cruz, Buenavista, as restricted by Cabrera (ibid.).

Bradypus gorgon Thomas, 1926: 309; Cabrera, 1958: 209 (as *B. infuscatus gorgon*). *Holotype*: BMNH 24.12.6.17, Colombia, Nariño, Isla Gorgona.

Bradypus tocantinus Lönnberg, 1942: 5; Vieira, 1955: 402 (as *B. tridactylus tocantinus*).

Holotype: NRMS 501, Pará, Cameté.

Bradypus miritibae Lönnberg, 1942: 8; Vieira, 1955: 402 (as *B. tridactylus miritibae*). *Holotype*: NRMS 9, Maranhão, Humberto de Campos (Miritiba).

Bradypus tridactylus Avila-Pires & Gouvêa, 1977: 17.

Type-locality: Brazil, possibly Bahia (Mertens, 1925:23).

Diagnosis: Throat and sides of face brown, continuous with color of chest and shoulder; no foramina in anterodorsal nasopharynx; large cranium; mandibular spout small or vestigial.

Range: From Costa Rica into South America to coastal Ecuador, through Colombia and Venezuela (except for delta of Río Orinoco and Guiana highlands), continuing east of the Andes through the forests of Ecuador, Perú and Bolivia to northern Argentina and forested Brazil (except for Amapá) to Paraná (Londrina MZUSP 6639) and Rio Grande do Sul (Cabrera, 1958: 208).

Specimens examined in Brazil and NMBE:

Alagoas – São Miguel MZUSP 7369; Sinumbú (Usina Sinumbú), Manabeiras MZUSP 7528, 7529.

Amazonas – Itacoatiara MZUSP 5301; Juruá MZUSP 2-1902 (Garbe); Lago Baptista MZUSP 5300; Rio Javari, "Estirão do Ecuador" MPEG 1840; Santa Cruz, Rio Eiru MZUSP 5428.

Espírito Santo – Colatina MZUSP 2240.

Maranhão – Imperatriz MPEG 2440; Humberto de Campos (Miritiba) MZUSP 2893, 2894.

Pará – "Pará," no other locality data NMBE 1,2,3,5,6,8,137 and no number; Belém MPEG 946, 2353, 2357, 2666, MZUSP 10660, 10666; Belterra MN 5630, 5779; Benevides, Retiro de Nazaré MPEG 2693; Castanhal MPEG 2356; Cameté MZUSP 5322, 5429, 5434; Curralinho MN 5011, 5033, 5038, 5045; Fordlândia MZUSP 930, 1865, 1972, 1992 (all A.M. Olalla's numbers); Igarapé Açú MPEG 2353 (O. Cruz), 2354 (O. Cruz); Igarapé Cacaual? ("Cacaual Grande, Santarém") MPEG 204 (G. Hagemann); Igarapé Castanheira MPEG 1514; Ilha Mexiana MPEG 297 (G. Hagemann); Piquiatuba, lower Rio Tapajós, right bank MZUSP 5426; Rio Paru de Oeste, cabeceiras do, MPEG 1743; Santarém MN 5787; Taperinha MPEG 1005 (G. Hagemann); Vigia MPEG 2358.

Paraná – Londrina MZUSP 6639.

Pernambuco – Tapera MZUSP 4287.

Rio de Janeiro – "Guanabara, Dist. Federal" MN 10506; Parati (Pedra Branca, Paraty) MN 5648, 6103, 7608, 8450; Parque Nacional de Itatiaia, Maromba PNI 82 e PNI 1449; Serra dos Órgãos NMBE 137; Teresópolis MN 7262, 7615.

São Paulo – Boracéia (Praia de) MZUSP 8247; Cantareira MZUSP 7206; Ipiranga MZUSP 1092, 2427; São Bernardo do Campo MZUSP 3535; Ubatuba MZUSP 1811.

Genus *Scaepus* Peters

Uniformly pale brown pelage over body and head except for black hair at base of neck, projecting over shoulders as two black plumes;

no middorsal speculum on male; more than one pair of foramina in anterodorsal nasopharynx; skull with pterygoid sinuses distinctly inflated; pronounced anteroposterior compression of teeth; mandibular spout long.

The senior author treats *Scaeopus* as Subgenus of *Bradypus*.

1. *Scaeopus torquatus* Illiger

Maned sloth, preguiça de coleira, ai-pixuna.

Bradypus torquatus Illiger, 1811: 109; Vieira, 1955: 402; Cabrera, 1958: 210.

Type-locality: Brazil, here restricted to the Atlantic drainage of Bahia, Espírito Santo, and Rio de Janeiro.

Diagnosis: See under genus.

Range: The remaining fragments of the Atlantic coastal forests of south-eastern Brazil from the states of Rio Grande do Norte to Rio de Janeiro (Coimbra-Filho, 1972).

Specimens examined in Brazil: Bahia — Ilhéus MN 11206, 11395, 19441, 19962A; Itabuna MZUSP 3506, 3507; Jequié MN 17300; Serrinha, Fazenda Oiteiro MN 17300.

Espírito Santo — "Espírito Santo," no other locality data MN 3882; Santa Teresa MN 5632, 5899.

Rio de Janeiro — Ilha Brussai MZUSP 10074.

FAMILY CHOLOEPIDAE.

The two-toed sloths, unau, preguiça real

Genus *Choloepus* Illiger

1. *Choloepus didactylus* (Linné)

Linné's two-toed sloth, unau, preguiça real.

Bradypus didactylus Linné, 1758: 34.

Choloepus didactylus, Vieira, 1955: 401 (as *C. didactylus didactylus*); Cabrera 1958: 211.

Choloepus florenciae J.A. Allen, 1913: 469; Cabrera, 1958: 212 (as *C. hoffmanni florenciae*) *Holotype*: AMNH 33910, Colombia, Caquetá, Florencia.

Type-locality: Surinam.

Diagnosis: Throat similar in color to pectoral hair; 1 pair of small and 1 pair of large foramina in the anterodorsal inter-ptyergoid space and usually no posterior foramina penetrating into the

ptyergoid sinuses; maximal (anterior) inter-ptyergoid space more than twice as wide as the minimal (posterior) interptyergoid space; ptyergoid sinuses broadly inflated, usually wider than 14 mm; immature specimens with maxilla in relatively broad contact with frontal bone; cervical vertebrae usually 7 (range 6-8 in sample of 7 specimens).

Range: From the delta of Rio Orinoco south in Venezuela, west to upper Orinoco drainage in Colombia (Meta), east to Guyana, Surinam and French Guiana, and in Brazil to the state of Maranhão (Humberto de Campos = Miritiba, MZUSP 2899) on the east and west along the banks of the Rio Amazonas — Solimões to the western Amazon basin of Colombia, Ecuador and Perú.

Specimens examined in Brazil, NMBE and MZUV: Amapá — Amapá MN 20577 (O. Cruz); Rio Araguari, Fazenda California MN 1906 (MPEG).

Amazonas — Codajáz INPA 1147; Igarapé Anibá MN 5963; Itacoatiara INPA 1621, MZUSP 5445, 5459, 5460; Juruá MZUSP 781; Lago do Baptista MN 5961; Manaus, Igarapé do Francês INPA 1051; Santa Cruz, Rio Eiru MZUSP 5447; Uaupés (São Gabriel) MN 1711.

Maranhão — Humberto de Campos (Miritiba) MZUSP 2899.

Pará — "Pará," no other locality data NMBE 16, 17, 18, 19, 981 and no number; Currálinho MN 5011, 5012, 5013, 5016, 5018, 5035, 5036, 5039, 5041, 5043, 5044, 5046, 5047; Ilha de Marajó NMBE 981; obtidos MPEG no number (G. Haggmann), MZUSP 3651; Rio Barcarena MZUV 85; Santarém MN 5678, 5685, 5686, 5733, 5735, 6467 (O. Cruz); Taperinha MPEG 1686 (G. Haggmann).

2. *Choloepus hoffmanni* Peters

Hoffman's two-toed sloth, unau, preguiça real.

Choloepus hoffmanni Peters, 1859: 128. One of the syntypes, ZMB 1944, skin and skull here designated as lectotype.

Choloepus augustinus J.A. Allen, 1913: 470; Cabrera, 1958: 211 (as *C. hoffmanni augustinus*). *Holotype*: AMNH 33909, Colombia, Huila, San Agustín.

Choloepus capitalis J.A. Allen, 1913: 472; Cabrera, *ibid.* (as *C. hoffmanni capitalis*) *Holotype*: AMNH 34152, Colombia, Niriño, Barbacoas.

Choloepus didactylus pallescens Lönnberg, 1928: 12; Cabrera, *ibid.* (as *C. hoffmanni pallescens*).

Holotype: NRMS 29, Perú, San Martín, Calavera.
Choloepus juruanus Lönnberg, 1942: 29; Vieira, 1955: 401 (as *C. didactylus juruanus*); Cabrera, 1958:212 (as *C. hoffmanni juruanus*). *Holotype*: NRMS 2601, Brazil, Amazonas, near confluence of Rios Juruá and Eiru (Santo Antonio).

Type-locality: Costa Rica, Heredia, Volcán Barba, the collection locality of Dr. Hoffmann given on the labels of the type series, and not Escasú, San José, as proposed by Goodwin (1946: 353).

Diagnosis: Throat pale contrasting with darker pectoral pelage; antero-dorsal inter-ptyergoid space with 1 pair of small foramina and 2 pairs of large foramina, the posterior pair opening into pterygoid sinuses (in some populations of *C. hoffmanni* the large anterior pair of foramina may be replaced by fossae); maximal inter-ptyergoid space less than twice the width of minimal inter-ptyergoid space; pterygoid sinuses more narrow, less than 13.5 mm; immature specimens with maxilla not in contact with the frontal bone, this contact prevented by the interposition of the nasal and lacrimal bones; cervical vertebrae usually 6 (range 5-6 in sample of 12 specimens).

Range: From northern Nicaragua to South America, west of Andes from Colombia to northwestern Ecuador (Esmeraldas) and western Venezuela; east of Andes from Rio Solimões in Perú to at least 11° S (Junín, Chanchomayo) and in western Brazil (southwestern Amazonas and probably Acre) east to northern Mato Grosso (Aripuaña).

Specimens examined in Brazil: Amazonas – Santa Cruz MZUSP 5447.

SUMMARY

A guide to the identification and distribution of the five species of tree sloths, families Bradypodidae and Choloepidae, is presented. As a further aid to investigators in Brazil of these unique, major components of the forest ecosystems, the specimens of sloths in the major reference collections in Brazil have been identified and are listed.

In this paper *Bradypus boliviensis* (Gray) and *B. griseus* (Gray) are considered to be

synonymous with *B. variegatus* (Schinz); lectotypes of *B. griseus* and *Choloepus hoffmanni* are selected; the type locality of *C. hoffmanni* is corrected; *C. juruanus* is synonymized to *hoffmanni*, rather than to *didactylus*; and the ranges of the recognized species are corrected. Santos (1977) arguments in favor of the generic status of *Scaeoopus* are accepted.

RESUMO

O presente trabalho serve de guia para identificação e de referência para a distribuição geográfica das cinco espécies de preguiças do Brasil, que pertencem às famílias Bradyrodidae e Choloepidae. Como informação adicional, os exemplares depositados nas coleções brasileiras são listados.

Bradypus boliviensis (Gray) e *B. griseus* (Gray) são considerados sinônimos de *B. variegatus* (Schinz); a localidade tipo de *C. hoffmanni* é corrigida; lectótipos de *B. griseus* e *Choloepus hoffmanni* são selecionados; *C. juruanus* é considerado sinônimo de *hoffmanni* e não de *didactylus*; e a distribuição geográfica das espécies é corrigida. Os argumentos de Santos (1977) são aceitos, quanto à elevação de *Scaeoopus* Peters a gênero.

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