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Report on some sigmodontine rodents collected in southeastern Brazil with descriptions of a new genus and six new species

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Abstract. The report is based on part of the collections of small mammals made in the Iporanga State Park, São Paulo, the Parque Nacional de Caparaó, Minas Gerais-Espírito Santo, and localities not visited in southeastern Brazil. Accounts are given of five genera (1 new) and 14 species (6 new, 1 undescribed) of sigmodontine rodents. Two earlier reports by other authors on the mammals of the Caparaó National Park are reviewed.

Key words. Rodentia, Sigmodontinae, Brazil, field survey, taxonomy, new genus, new species.

Introduction

Five field surveys of the small southeastern Brazilian mammals were conducted between 1986 and 1992 by the Field Museum of Chicago. Financial support was provided by the Barbara E. Brown Mammal Research Fund. The sponsoring and cooperative Brazilian Institutions are acknowledged individually in the account. This report deals primarily with results of studies of certain sigmodontines mostly collected in the Parque Nacional de Caparaó, Minas Gerais, the Parque Estadual Petar, Iporanga, São Paulo, and comparative material in the collections of the Field Museum.

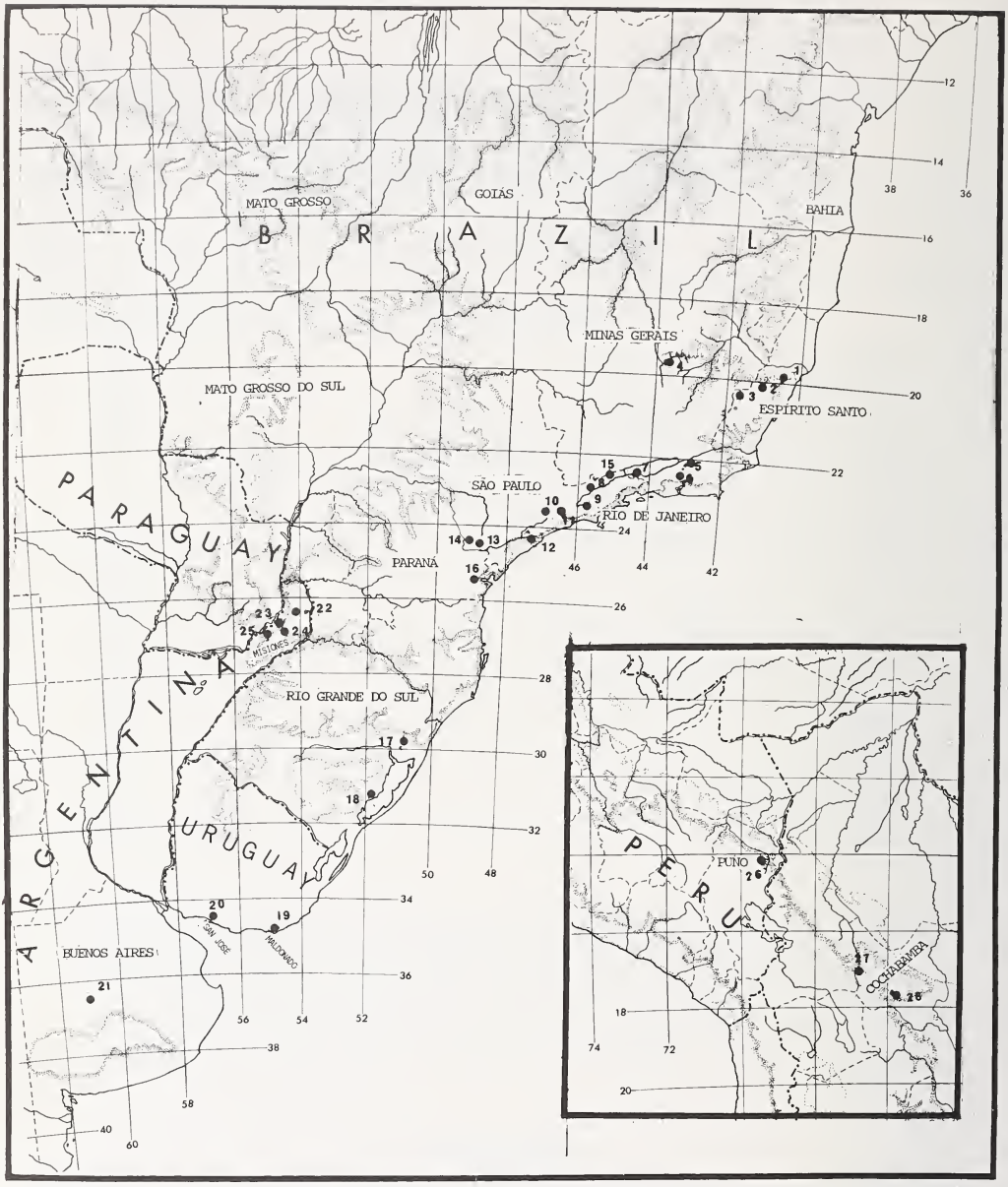


Fig. 1: Map of collecting localities mentioned in text and identified by number in gazetteer. The southeastern South American area shown is a portion of the Southeastern Zoogeographic Province.

Localities of specimens mentioned in text and plotted by number in fig. 1: 1 Santa Teresa, Espírito Santo, Brazil; 2 Engenheiro Reeve, Espírito Santo, Brazil; 3 Caparaó, Minas Gerais, Brazil; 4 Lagoa Santa, Minas Gerais, Brazil; 5 Teresópolis, Rio de

Janeiro, Brazil; 6 Centro de Primatológia, Rio de Janeiro, Brazil; 7 Itatiaya, Rio de Janeiro, Brazil; 8 Campos do Jordão, São Paulo, Brazil; 10 Cotia, São Paulo, Brazil; 11 Alto da Serra, São Paulo, Brazil; 12 Ribeirão Fundo, São Paulo, Brazil; 13 Iporanga, São Paulo, Brazil; 14 Apiaí, São Paulo, Brazil; 15 Piquete, São Paulo, Brazil; 16 Roça Nova, Paraná, Brazil; 17 Taquara, Rio Grande do Sul, Brazil; 18 São Lourenço, Rio Grande do Sul, Brazil; 19 Maldonado, Maldonado, Uruguay; 20 Arazatí, S. Ecilda, San José, Uruguay; 21 Torrecita, Buenos Aires, Argentina; 22 Tobunas, Misiones, Argentina; 23 Caraguatay, Misiones, Argentina; 24 Dos de Mayo, Misiones, Argentina; 25 Puerto Gisela, Misiones, Argentina; 26 Limbani, Puno, Perú; 27 El Choro, Cochabamba, Bolivia; 28 Colomi, Cochabamba, Bolivia.

Gazetteer of collecting localities mentioned in text
(numbers in parentheses refer to positions on map, fig. 1):

ARGENTINA
Buenos Aires
Torrecita (= Urdampilleta), 3615/6106, 108 m (21)
Misiones
Caraguatay, Río Paraná 2637/5446, 100 m (23)
Dos de Mayo, 2702/5439, 300 m (24)
Puerto Gisela, Río Paraná, 2701/5527, 50 m (25)
Tobunas, 2628/5354, 200 m (22)

BOLIVIA
Cochabamba
Muelle Muelle, 2700 m, not located
Colomi, 1731/6552, 3075 m (28)
El Choro, Ayapoc, 1656/6652, 3500 m (27)

BRAZIL
Espírito Santo
Engenheiro Reeve, 2046/4128, 400—600 m (2)
Santa Teresa, 1955/4036, 659 m (1)
Minas Gerais
Caparaó, Parque Nacional de, 2025/4147 (3)
Arrozal, 2300 m
Cachoeira Bonita, 1750 m
Centro de Visitantes, 1300 m
Pico da Bandeira, 2700 m; 2890 m
Segredo, 2100 m
Terreirão 2370 m
Tronqueira, 1970 m
Vale Encantado, 1980 m
Vale Verde, 1200 m
Espírito Santo
Pedra Roxa, 100 m
Lagoa Santa, 1938/4353, 760 m (4)
Paraná
Roça Nova, Serra do Mar, 2531/4830, 1000 m (16)
Rio de Janeiro
Centro de Primatologia, 2254/4314, sea level (6)
Fazenda Boa Fe (see Teresópolis)
Itatiaya, 2223/4438, 1800 m (7)
Teresópolis, 2226/4259, 902 m (5)

Rio Grande do Sul
Rio dos Linos [Sinos] (see Taquara)
São Lourenço (São Lourenço do Sul), 3122/5158 (18)
Taquara, 2939/5047, 29 m (17)
Taquara do Mundo Novo (see Taquara)
São Paulo
Alto da Serra (= Paranapiacaba), 2347/4619, 800 m (11)
Apiaí, 2431/4850 200 m (14)
Boraceía, Serra do Mar, 2339/4554, 800—900 m (9)
Campos do Jordão, 2244/4535, 2585 m (8)
Cotia, 2337/4656, near sea level (10)
Iporanga, 2435/4835, 200 m (13)
Piquete, Serra da Mantiquiera, 2236/4511, 600—900 m (15)
Ribeirão Fundo, 2415/4745, 30 m (12)

PERÚ
Puno
Limbani, 1408/6942 (26)

URUGUAY
Maldonado
Maldonado, 3454/5457 sea level (19)
San José
Arazatí, S. Ecilda, 3433/5657 sea level (20)

Field Museum small mammal surveys in Brazil, 1986—1992

Our study of the small mammals of southcentral and southeastern Brazil began with live trapping in the *campos cerrados* of Brasília, D. F., during July—August 1986. The prime objective at the time was the capture of the fossorial sigmodontine rodent *Juscelinomys candango* Moojen, 1965. The species is known from the original series of 8 specimens, including holotype, taken from a *cerrado* subterranean system in the Parque Nacional de Brasília. The live animal has never been seen again. Our intensive trapping at ground level, and excavations of burrows proved fruitless. Nevertheless, a collection of about 150 rodents of 15 genera resulted from our search. Most of the material is still under study. The reports published to date include the description of a new species of *Thalpomys* (Hershkovitz 1990a), a new species of *Akodon* (Hershkovitz 1990b) and a new genus *Microakodontomys* and its type species, *M. transitionalis* (Hershkovitz 1993).

Official permits for work in the Parque Nacional de Brasília and cerrado (fig. 2) were granted through the sponsorship of Professor Ulises Caramaschi of the Museu Nacional. The then graduate assistant of the mammal department, Christopher Tribe, was assigned to the project. Others who assisted with field work, material support, hospitality and in many other ways, included Professor Jader Soares Marinho Filho, and Professor Milton Thiago de Mello, both of the Universidade de Brasília, Alberto de Paulo Carlos, of IBAMA (Instituto Brazileiro do Meio Ambiente e de Recursos Naturais Renováveis), Miguel Angelo Marini, a student, and Dr. Braulio F. de Sousa Dias of the Brazilian Geographic Institute.

Scott Lindbergh, an American resident in Brasília D. F., who was studying the behavior of the *cerrado* howler monkey, *Alouatta fusca*, volunteered his services without conditions. Scott's devoted and generous assistance throughout the entire field program accounts for much of the success of our field work here and elsewhere in eastern Brazil.

Fig. 2: Views of Parque Nacional de Brasília, Brazília, D.F.

The Primate Center of Rio de Janeiro about 60 km N of the city, with small remnants of Atlantic rain forest was visited October—November, 1987, for sampling its small mammals. About 120 specimens were collected but the unidentified material has not been released by our then Brazilian sponsor and field associate, Professor Jader Soares Marinho Filho. Field work was facilitated by the Center's Manager, Lourenço, and by the dedicated assistance of Professor Jader Marinho, his student Marcelo Lima Reis, and Field Museum Associate Barbara E. Brown. I am particularly grateful to the then Director of the Center, Dr. Adelmar Coimbra-Filho for his deep interest in our labors and unstinting cooperation.

The Rio de Janeiro State Park at Teresópolis, was worked July—August 1988. Our Brazilian sponsor was again Professor Jader Marinho. The approximately 125 specimens collected still remain in his care and have not been made available for study.

Field assistants included Jader Marinho Filho, Marcelo Lima Reis, and our Barbara Brown.

The São Paulo State Park Petar, Municipio Iporanga (fig. 3), engaged our survey efforts November—December, 1989. The approximately 220 specimens distributed in about 20 genera were delivered to the Zoology Museum of the University of São Paulo, for processing. The entire collection is now being studied in the Field Museum. Dr. Paulo E. Vanzolini, Director of the Museu de Zoologia, Universidade de São Paulo, was our sponsor.

Fig. 3: Four views of Parque Estadual Petar, Iporanga, São Paulo.

The Parque Nacional de Caparaó (figs 4, 5), with an area of 16,194 hectares, straddles the comparatively dry part of western Minas Gerais and the humid eastern or Atlantic slope of Espírito Santo. The Park, between 20°19'—20°37'S, 41°43'—42°53'W (fig. 1) was established May, 1961 by Federal decree, far too late to prevent virtually complete destruction of the original forest cover.

The Serra do Caparaó at the northernmost edge of the Serra do Mar is rugged mountain country with elevations from about 800 m to the Pico da Bandeira at 2890 m. The terrain is broken by many steep valleys and waterfalls. The vegetation in 1981 was described as tropical rain forest to about 1800 m then open grassland above 2400 m. In 1989 the flora was described by IBAMA as almost entirely secondary, considerably degraded, with no resemblance to the original formations. The vegetation had become increasingly poorer at higher altitudes, with dominance of epiphytes, mosses and lichens. The mammalian fauna, according to IBAMA, was reduced to such widespread species as the rabbit, agouti, squirrel, and small predators including eira cat, fox, racoon and coati.

Review of the Ruschi (1978) and Blair (1989) reports on the mammals of the Parque Nacional de Caparaó

The recent mammals of the Parque Nacional de Caparaó are known from two comprehensive reports. The first, by Ruschi (1978) appears to be a collection of

Fig. 4: Views of Parque Nacional de Caparaó, Minas Gerais.

scattered data of mostly personal observations gathered over a period of 40 years. The second, by Blair (1989) is from her unpublished doctoral thesis based on 18 consecutive months of field work. Each report lacks documentation for specimens collected and most of the identifications must be taken at face value. Nonetheless, their reports are the most comprehensive available in terms of the mammals of the region.

The Ruschi account

The late Augusto Ruschi, a long time resident of Santa Teresa, Espírito Santo, observed the birds and mammals, particularly hummingbirds and bats, of the Caparaó mountains for over 40 years. His (1978) report lists 74 species of mammals, 251 species of birds, and a detailed account of the vegetation and life zones of the Parque Nacional de Caparaó. The account includes names of authors with bibliographic references to original descriptions, and scientific and vernacular names of the species. A bat of the genus *Tadarida* was described.

Ruschi (p. 26) emphasized the fact that survival of the woolly spider monkey (*Brachyteles arachnoides*) in the Park was threatened (none survived) and that the lion tamarin, *Leontopithecus rosalia chrysomelas* disappeared from Espírito Santo in 1978, most of its habitat having been converted to charcoal. He predicted early extinction of the endemic mouse *Abrawayomys* from the nearby Forno Grande Biological Reserve.

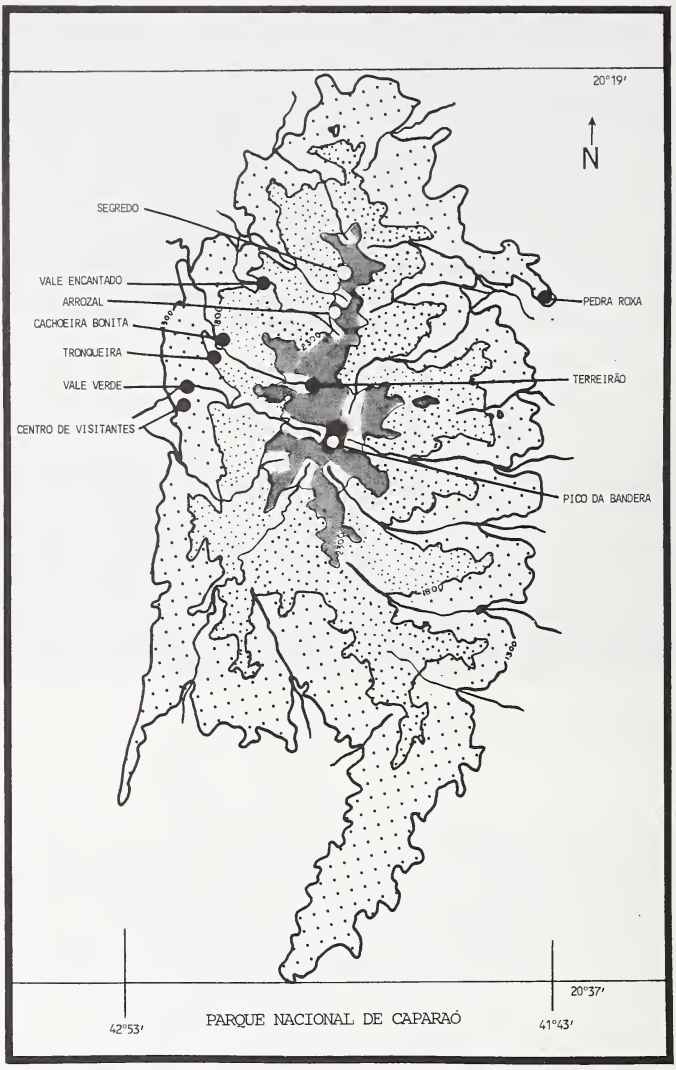


Fig. 5: Map, Parque Nacional de Caparaó, Minas Gerais — Espírito Santo; collecting stations shown are on the Minas Gerais (western) slope, except Pedra Roxa in the Espírito Santo (eastern) watershed.

The "Museu de Biologia Prof. Mello Leitao," issuer of Ruschi's publications, housed no mammals and its *Boletim*, like the Museum, was the property of Dr. Ruschi. He listed the following Caparaó mammals in 1978. Voucher specimens may not exist but the identifications are presumed to be reliable. Nominal equivalents as used in *Mammal Species of the World* follow in brackets, the subspecies suppressed by the compilers. The work was edited by Wilson and Reeder (1993).

MARSUPIALIA
Didelphidae
Didelphis marsupialis Linnaeus
Didelphis aurita Wied-Neuwied
Metachirus nudicaudatus myosurus Temminck [*Metachirus nudicaudatus* É. Geoffroy]
Philander philander philander [*Caluromys philander* Linnaeus]
Chironectes minimus Zimmermann
Monodelphis scalops Thomas
Monodelphis iheringii Thomas [*Monodelphis iheringi* Thomas]
Marmosa cinerea cinerea Temminck 1824 [*Micoureus demerarae* Thomas; *cinerea* Temminck preoccupied by *D. cinerea* Goldfuss, 1812]

CHIROPTERA
Molossidae
Molossus ater E. Geoffroy
Eumops auripendulus Shaw
Tadarida espiritosantensis Ruschi ["probably a synonym of *Nyctinomops laticaudatus*," Koopman, 1993: 240]
Phyllostomidae
Phyllostomus hastatus Pallas
Chrotopterus auritus australis [*Chrotopterus auritus* Peters]
Mimon bennetti Gray
Micronycteris megalotis Gray
Glossophaga soricina Pallas
Artibeus jamaicensis planirostris Spix [*Artibeus planirostris* Spix]
Desmodontidae [Desmodontinae subfamily of Phyllostomidae]
Desmodus rotundus É. Geoffroy
Diphylla ecaudata Spix
Vespertilionidae
Myotis nigricans Schinz
Lasiurus ega argentinus Thomas [*Lasiurus ega* Gervais]

PRIMATES
Callicebus gigot [*Callicebus personatus* É. Geoffroy]
Alouatta fusca É. Geoffroy
Cebus nigritus Goldfuss [*Cebus apella* Linnaeus]
Brachyteles arachnoides É. Geoffroy
Callithrix aurita caelestis Miranda Ribiero [*Callithrix aurita* É. Geoffroy]
Callithrix flaviceps Thomas

EDENTATA
Tamandua tetradactyla Linnaeus
Bradypus tridactylus brasiliensis Blainville [*Bradypus variegatus* Schinz]
Euphractus sexcinctus flavimanus Desmarest [*Euphractus sexcinctus* Linnaeus]
Dasypus novemcinctus Linnaeus

LAGOMORPHA
Sylvilagus brasiliensis minensis Thomas [*Sylvilagus brasiliensis* Linnaeus]

RODENTIA
Sciurus ingrami Thomas [*Sciurus aestuans* Linnaeus]
Thomasomys pyrrhorhinus Wied Neuwied [*Wiedomys pyrrhorhinus* Wied-Neuwied]
Thomasomys dorsalis collinus Thomas [*Delomys dorsalis* Hensel]
Thomasomys sublineatus Thomas [*Delomys sublineatus* Thomas]
Nectomys squamipes olivaceus Hershkovitz [*Nectomys squamipes* Brants]
Rhipidomys masticalis Lund
Phaenomys ferrugineus Thomas
Akodon arviculoides cursor Winge [*Akodon cursor* Winge]
Akodon subterraneus Hensel [*Thaptomys nigrita* Lichtenstein]

Oxymycterus nasutus Waterhouse
Blarinomys breviceps Winge
Coendou prehensilis Linnaeus
Cavia aperea azarae Lichtenstein [*Cavia aperea* Erxleben]
Dasyprocta aguti Linnaeus
Cuniculus paca Linnaeus [*Agouti paca* Linnaeus]
Euryzygomatomys guiara Brandt [*Euryzygomatomys spinosus*]
Echimys medius Thomas [*Echimys blainvillei* F. Cuvier]

CARNIVORA
Dusicyon vetulus Lund [*Pseudalopex vetulus* Lund]
Dusicyon thous azarae Wied Neuwied [*Cerdocyon thous* Linnaeus]
Procyon cancrivorus nigripes Mivart [*Procyon cancrivorus* G. Cuvier]
Nasua nasua nasua Linnaeus [*Nasua nasua* Linnaeus]
Nasua nasua solitaria Schinz [*Nasua nasua* Linnaeus]
Potos flavus nocturnus Wied Neuwied [*Potos flavus* Schreber]
Tayra barbara gulina Schinz [*Eira barbara* Linnaeus]
Grison furax Thomas [*Galictis cuya* Molina]
Panthera onca Linnaeus
Puma concolor greeni Nelson & Goldman [*Puma concolor* Linnaeus]
Felis pardalis brasiliensis Oken [*Leopardus pardalis* Linnaeus]
Felis wiedii Schinz [*Leopardus wiedi*]
Felis yaguarondi Lacépède [*Herpailurus yaguarondi* É. Geoffroy]
Felis pardinoides Gray [*Leopardus tigrinus* Schreber]

PERISSODACTYLA
Tapirus terrestris Linnaeus

ARTIODACTYLA
Tayassu pecari Link
Tayassu tajacu Linnaeus [*Pecari tajacu* Linnaeus]
Mazama americana Erxleben
Mazama simplicicornis Illiger [*Mazama gouazoupira* G. Fischer]

Remarks. Most of the species recorded by Ruschi may still be found on the Espírito Santo slope. The list of bats may be longer. Also present are the rabbit, squirrel, and more kinds of sigmodontine rodents. Some of the carnivores may have been extirpated. The once abundant tapir, deer, peccaries and most if not all monkeys may have disappeared.

The Blair Report 1979—1980

Blair recorded 53 species captured or observed in the Caparaó National Park from May 1979 through October 1980.

The small mammals were live trapped, sexed, marked, measured and released. Trap lines were along transects, hence not selective for species diversity. Bats were caught in mist nets. Carnivores were identified by recovered feces or pellets, burrows, tracks, sight or other external signs. Identifications of captured animals were based on their external measurements compared with those of previously identified specimens preserved in museums or recorded in the literature. Characters other than standard external dimensions taken from the anesthetized captives were not used in the identifications. The identification of feces by size and shape could be problematic. Authorities for generic and specific names were systematically eschewed.

None of the animals recorded were preserved for confirmation of their identifications and they are listed as recorded. Sight records are bracketed.

MARSUPIALIA
- *Didelphis marsupialis*
- *Metachirops opossum*
- *Marmosa cinerea*
- *Marmosa murina*
- *Marmosa* sp. 3

EDENTATA
- *Cabassous tatouay*
- *Dasypus novemcinctus*
- *Dasypus septemcinctus*
- *Euphractus sexcinctus*
- *Myrmecophaga tridactyla*

PRIMATES
- *Cebus apella*
- *Callicebus moloch*

CHIROPTERA
- *Carollia perspicillata*
- *Desmodus rotundus*
- *Glossophaga soricina*
- *Histiotus velatus*
- *Phyllostomus hastatus*
- Stenodermatinae sp. indet. (bones from owl pellets)
- *Sturnira* sp.
- *Uroderma bilobatum*
- *Vampyrops [= Platyrrhinus] lineatus*
- *Vampyressa pusilla*

RODENTIA
- *Akodon arviculoides*
- *Akodon cursor*
- *Akodon serrensis*
- *Blarinomys breviceps*
- *Nectomys squamipes*
- *Oryzomys bicolor*
- *Oryzomys capito*
- *Oryzomys concolor*
- *Oryzomys eliurus*
- *Oryzomys flavescens*
- *Oryzomys fornesi*
- *Oryzomys intermedius*
- *Oryzomys nigripes*
- *Oryzomys nitidus*
- *Oryzomys ratticeps*
- *Oxymycterus hispidus*
- *Thaptomys nigrita*
- *Sciurus ingrami*
- *Thomasomys dorsalis*
- *Thomasomys* [= *Wilfredomys*] *oenax* (bones from owl pellets)
- Unknown species: "Red mouse," diurnal; in grassland at 2500 m; long-tailed
- *Cavia aperea*
- *Coendou prehensilis*
- *Dasyprocta agouti*
- *Echimys medius*

CARNIVORA
- *Nasua nasua*

Procyon cancrivorus
[*Pseudolopex gymnocercus*]
[*Cerdocyon thous*]
Chrysocyon brachyurus
[*Lycalopex vetulus*]
Galictis vittata
Eira barbara
Felis [*Leopardus*] *wiedi/tigrinus*
Felis [*Herpailurus*] *yagouaroundi*
Felis [*Leopardus*] *pardalis*
Felis [Puma] *concolor*

ARTIODACTYLA
Tayassuidae sp. indet.

LAGOMORPHA
Sylvilagus brasiliensis

Field Museum-Museu Nacional joint survey of small mammals of the Parque Nacional de Caparaó, 1992

The Parque Nacional de Caparaó expedition promoted by the Field Museum and sponsored by the Museu Nacional, surveyed the small mammals, particularly the Sigmodontinae, September—October 1992. Participants in field work included Dr. Alfredo Langguth, Curator of Mammals of the Museu Nacional, our official sponsor for the field work, and his two assistants, Stella M. France and Allison A. Sodre.

The Field Museum was represented by the author and Associate Barbara E. Brown. Other participants included parasitologist Dr. Pedro Marcos Linardi of the University of Minas Gerais who focused on the ectoparasites of the captured mammals; Cibele Bonvecino, graduate student of the Universidade Federal de Rio de Janeiro, assisted actively in field work, her primary concern, however, being the cytogenetics of captured rodents. IBAMA representative Alberto de Paulo lent considerable field support. The indispensable Field Museum Associate Scott Morrow Lindbergh assured the success of the expedition with his keenly directed and indefatigable labors.

The Park Director José Olimpo Vargas provided housing. The Assistant Director Estevão Marchesini Fonseca helped with our installation, and facilitated our operations in many ways during the entire stay.

The Field Museum-Museu Nacional survey of the mammals of the Parque Nacional de Caparaó resulted in the capture and preservation of approximately 427 small mammals. Represented are 31 species distributed among the 21 genera listed below (number of species in each genus shown in parentheses).

Marmosa Gray (1)
Marmosops Matschie (1)
Micoureus Lesson (2)
Monodelphis Burnett (1)
Philander Tiedemann (1)
Didelphis Linnaeus (1)
Carollia Gray (1)
Desmodus Wied (1)

Glossophaga É. Geoffroy (1)
Akodon Meyen (3 including 1 new)
Thaptomys Thomas (1)
Brucepattersonius (new genus; 4 all new)
Oxymycterus Waterhouse (2 including 1 new)
Calomys Waterhouse (1)
Oryzomys Baird (2)
Oligoryzomys Bangs (3)
Nectomys Peters (1)
Delomys Thomas (2)
Proechimys J. A. Allen (1)
Euryzygomatomys Goeldi (1)
Cavia Pallas (1)

Results of the study of all the material collected in Caparaó, Iporanga and other localities of the region are being prepared for publication. The taxa included in this first report are the following.

Delomys Thomas
- *D. dorsalis* Hensel
- *D. sublineatus* Thomas

Akodon Meyen
- *A. serrensis* Thomas
- *A. cursor* Winge
- *A. mystax* (new species)

Thaptomys Thomas
- *T. nigrita* Lichtenstein

Brucepattersonius (new genus)
- *B. soricinus* new species and type species
- *B. igniventris* (new species)
- *B. griserufescens* (new species)
- *B. albinasus* (new species)
- *B. iheringi* Thomas
- *B.* sp. (from Misiones, Argentina, the *"Oxymycterus iheringi"* of Massoia [1963], not Thomas)

Oxymycterus Waterhouse
- *O. rufus* Fischer
- *O. caparaoe* (new species)

No large mammals other than the opossum (*Didelphis*) and coati (*Nasua*) were seen during our short visit. Signs of other predators were absent. Bats were not seen in flight at night but bad weather hindered observation and, except for the most common species, were not located during the day in apparently suitable roosts. The Ruschi and Blair reports present a picture of a rich mammalian fauna.

Species accounts

Abbreviations used include: BM = British Museum (Natural History), London; FM = Field Museum, Chicago; MN = Museu Nacional de Brazil, Rio de Janeiro; MZUSP = Museu de Zoologia, Universidade de São Paulo, São Paulo; PH = field numbers from 1992 surveys of Caparaó; E = Ear pinna from notch; GSL = Greatest skull length; HB = Length of head and body combined; HF = Hind foot length with claw (cu); without claw (su); T = Tail length.

Delomys Thomas

Delomys Thomas. Type species *Hesperomys dorsalis* Hensel, 1872, by original designation.

The genus has been revised by Voss (1993) with most of the taxonomic problems resolved. Of the two recognized species 72 specimens of *Delomys dorsalis* and 46 of *D. sublineatus* were examined by Voss. The new material studied here, most not seen by Voss, consists of 88 specimens with the registry numbers of the Museu de Zoologia, University of São Paulo, the Museu Nacional, Rio de Janeiro, and the Field Museum. Included are 72 specimens of *Delomys dorsalis* from 12 localities, and 15 specimens of *D. sublineatus* from 5 localities, all listed beyond under specimens examined, their localities plotted in figure 1 (map). The new material provided a basis for review of parts of Voss's findings.

Characters. *Delomys* is a medium sized sigmodontine; tail from slightly longer (105 %) than combined head and body length (HB) to shorter (75 %); hind foot long, narrow, length with claw 20 % to 25 % HB; ear large, length from notch about 15 % to 16 % HB; condylobasal length of skull about 20 % to 25 % HB, or approximately the same proportion as hind foot length with claw; mammae, 2 inguinal, 2 abdominal, 2 postaxial, and occasionally 2 pectoral = 6 or 8.

Coloration of upperparts dark brown (dominantly eumelanin) to buffy (dominantly pheomelanin), underparts dominantly grayish (dilute eumelanin); a more or less defined dark brown middorsal stripe nearly always present.

Dorsal contour of skull slightly convex; rostrum elongate; distal part of nasals and premaxillae combined usually project as a tube beyond incisors, the cartilaginous median septum (often lost in preparation) between nasal tips produced slightly beyond in expanded form; interorbital region more or less hourglass shaped, the supraorbital margins posteriorly rounded, square or frequently beaded, the beading continued behind as lateral parietal ridges; zygomatic arches moderately expanded with slight anterior convergence; perpendicular zygomatic plate visible viewed from above; interparietal bone well developed; incisive foramina comparatively short, not extending to level of first molars; palatal bridge short, wide, without conspicuous posterolateral pits, the posterior border not produced behind level of third molars; stapedial and sphenofrontal foramina present, squamosal-alisphenoid groove more or less defined; mandible with capsular tip of incisor root little or not pronounced.

Upper incisors small, inclination orthodont to opisthodont; molars brachyodont, pentalophodont, tuberculate, m_1 with well developed ectolophid.

Pentalophodonty or fusion of the mesostyle (–id) with the mesoloph (–id), in all molars to form the mesolophostyle (–id), is the one and only consistent and definitive character of thomasomyines (*Delomys* included) and oryzomyines that distinguishes them from all other sigmodontines. Muroid molars with a mesostyle (–id) discrete or absent in any tooth, or with a mesoloph (–id) discrete or absent in any tooth, are not pentalophodont. Disjunction between mesostyle (–id) and mesoloph (–id) with reduction and ultimate loss of either or both elements in any tooth of a dental system marks the irreversible transition from pentalophodonty to tetralophodonty (cf. Hershkovitz 1993).

Generic Relationships. In 1962, I (p. 21) suggested that *Thomasomys*, with a complex glans penis and a simple chambered stomach, must be much like the ancestral morphotype which could have given rise to the South American cricetines. The thomasomyine lineage, in my opinion at the time, included *Thomasomys, Nyctomys, Otonyctomys, Phaenomys, Rhipidomys,* and *Wilfredomys*. Elsewhere in the account (1962: 84, footnote 3), *Aepeomys, Inomys, Delomys* and *Erioryzomys* were referred to the *thomasomyine* group. It was cautioned, however (1966: 12, footnote), that "some characters shared by members of the group might be phenetic rather than phyletic." Subsequent removal of *Nyctomys* and *Otonyctomys* proved this point. With passage of time and increase in knowledge, more modifications were made.

The phylogenetic position of *Delomys* was analyzed by Voss (1993: 21) on the basis of morphological comparisons with *Thomasomys* and *Oryzomys*. *Thomasomys*, with 25 or more

species (Musser & Carleton 1993: 749), was represented in the comparisons by its type species, *T. cinereus*. *Oryzomys*, with 36 species (Musser & Carleton 1993: 712), was represented by the type species, *Oryzomys palustris*, a highly derived if not the most derived species, of the genus.

The eighteen characters used by Voss for comparison of *Delomys dorsalis* and *D. sublineatus* with *Thomasomys cinereus* and *Oryzomys palustris* are briefly discussed below. Numbers 19, 20 and 21 are additional sigmodontine characters mentioned separately by Voss (1993: 9, 12). Comparisons of the characters of type species of *Delomys* and *Thomasomys* are given in table 1, their nipples in table 2; measurements of *Delomys dorsalis* are in table 3, and of *D. sublineatus* and *D. dorsalis* in table 4.

1. Ungual tufts. Present in all four morphotypes (*Delomys dorsalis, D. sublineatus, Thomasomys cinereus, Oryzomys palustris*). Starting from a hypothetical primitive state of barely covering the claws, the tufts become hypertrophied in *Delomys* and *Thomasomys cinereus*. In *Oryzomys palustris*, they evolved in a negative direction to the point of near disappearance.

2. Plantar pads. The state of the 6 plantar pads (two metatarsal and four interdigital) is regarded as primitive in *Delomys* and *Thomasomys*. The system of 5 plantar pads in *Oryzomys* appears to be derived.

3. Mammae. The primitive number of paired teats or nipples in sigmodontines is 3. The paired formula in mammals developed pari passu from inguinal to abdominal and postaxial as in *Thomasomys* and nearly all Delomys. A pectoral pair became a fixture in oryzomyines, phyllotines and others, but in *Delomys* only as an infrequent variable (table 2). Voss's (1993: 13, 30) interpretation of the comparative morphology appears to be correct.

4. Rostral tube. This highly variable character ranges in *Delomys* from slightly protruded to extremely so but no more than in certain related species (i. e., *Thomasomys cinereiventer*). The rostral tube said to be absent in *Thomasomys cinereus* is actually more than incipient.

5. Zygomatic notch and zygomatic plate. Definition of the zygomatic notch depends largely on the form of the plate. In some *Delomys* (MN 31961, 31965) the notch may be as "indistinct" as illustrated by Voss (1993, fig. 5B) for *Thomasomys*, but in some *Thomasomys*, the notch may be nearly as "distinct" as illustrated by Voss (1993, fig. 5A) for *Delomys*. Definition of the notch in *Thomasomys* and *Delomys* is likewise a continuum beginning with the less derived state in *Thomasomys*.

6. Interorbital region and temporal crests. The hourglass shape as described and figured by Voss (1993: 15, fig. 6) for *Delomys* and *Thomasomys* holds. The posterior half of the supraorbital margin, however, is described as smoothly rounded, or sometimes gently squared but with sharp edges, beads, or projecting shelves never developed. This is said to be "the plesiomorphic condition." It does not hold, however, for nearly all specimens at hand of *Delomys* and *Thomasomys cinereus*.

7. Palate. The palate of *Delomys* and *Thomasomys* is correctly defined as short, that is with posterior margin not produced behind the third molars. It is seen as "probably plesiomorphic." According to Voss (1993: 15) "the bony palate of *Delomys* is short because the mesopterygoid fossa extends anteriorly between the third molars." The mesopterygoid fossa, a feature without definition in itself, does not form the palate or fashion its margin. It is, on the contrary, defined by the bony palate.

8. Mesopterygoid fossa and sphenopalatine vacuities. The sphenopalatine vacuities, slits or fenestrations of the bony roof of the mesopterygoid fossa vary in *Delomys* from nearly completely ossified, as depicted by Voss (1993, fig. 7 B) for *Thomasomys*, to 2 and 3 times the size shown for *Delomys* in his fig. 7 A. The roof of the mesopterygoid fossa in *Thomasomys cinereus* is ossified with few minute exceptions in the 30 specimens examined here. The unfenestrated or completely ossified roof may not be primitive. Ossification is an ongoing developmental process but need not be complete in any one structure.

9. Alisphenoid strut. The strut, absent in *Delomys* but present in *Thomasomys cinereus*, may be the most trenchant character for separation of the two genera.

Table 1: Comparisons of *Delomys* and *Thomasomys* based on their type species *Delomys dorsalis* Hensel and *Thomasomys cinereus* Thomas. *Thomasomys cinereiventer* J. A. Allen included for comparison.

Character	A *Delomys*	B *Thomasomys*	C *cinereiventer*
1. Mammae	2. 3 or 4 pairs	1. 3 pairs	1. As in B
2. Tail length	2. From 75 % as long as head and body combined to 5 % longer; average about equal.	2. Always longer	2. As in B
3. Blackish middorsal stripe	3. Always present, usually well defined	3. Absent	3. As in A, but broader, diffuse
4. Bevel of posterior surface of lower incisors	4. 60—70 % from tip	4. 40—60 % from tip	4. As in B
5. Bevel of posterior surface of upper incisors	5. 50—75 % from tip	5. Nearly to or quite to alveoli	5. As in A
6. Zygomatic plate	6. Forward projecting, anteorbital foramen (notch) well exposed seen from above	6. Hardly or not forward projecting, foramen slightly or not exposed seen from above	6. As in A
7. Nasals with premaxillae	7. Usually extended as a tube	7. Tips of nasals usually on same vertical plane as incisors, sometimes slightly anteriad	7. As in A
8. Supraorbital beads or ridges	8. Partially present	8. Absent	8. As in A
9. Temporal ridges	9. Present but weak	9. Variable	9. Absent[1]
10. Nasals	10. Tapered to obtuse point	10. Slightly expanded to rounded tip	10. As in A
11. Zygomatic arches anteriorly	11. Slightly convergent	11. Expanded or rounded	11. As in A
12. Frontoparietal suture	12. Widely rounded	12. Narrowly rounded	12. As in A
13. Incisive foramina	13. Subovate, about as open in front as behind	13. Narrower in front than behind	13. As in A
14. Ascending mandibular ramus	14. Wide, nearly square	14. Narrow, rectangular	14. As in B
15. Coronoid process	15. Short, as spine	15. Elongate, as process	15. As in B
16. Sigmoid notch	16. Short, rounded, deep	16. Long, shallow	16. As in B
17. Molars	17. Large, long	17. Smaller, shorter	17. As in B
18. Upper incisors	18. Opisthodont to orthodont	18. Mostly orthodont	18. As in B
19. Lower incisors	19. Fine, short	19. Heavier, longer	19. As in B
20. Capsule of upper incisor root	20. Not bulging	20. Bulging	20. As in A
21. Capsular process of lower incisor	21. Slightly or not indicated	21. Slightly pronounced	21. As in B
22. Entepicondylar foramen	22. Absent	22. Not available	22. Not available
23. Articulation of rib 1	23. With thoracic 1st, or cervical 7th and thoracic 1st	23. Not available	23. Not available
24. Alisphenoid strut	24. Absent	24. Present	24. Present
25. Ectolophid	25. Present	25. Absent	25. Absent

[1] weakly developed in old individuals

10. Carotid circulation. Present as described in *Delomys* and *Thomasomys cinereus*. Pattern 1 of Voss (1993: 18, 24) appears to be primitive.

11. Tegmen tympani. This outgrowth of the periotic bone overlies the squamosal bone in *Delomys* and *Thomasomys* as stated. It also may merely contact the squamosal bone, and in a few samples is separated from it. Overlapping is said to be primitive but perhaps is an advanced stage of a relationship between bones.

12. Capsular process. A minute point marking the tip of the lower incisor root in the mandible is present in *Delomys* and most *Thomasomys cinereus*, but may be slightly swollen in individuals. It appears that the more pronounced the capsular process, the more derived.

13. Incisors. Judgement of the amount of inclination of the upper incisor is largely subjective. Voss (1993: 24, fig. 5, A, B) figures and describes the *Delomys* incisor as "small and strongly opisthodont," that of *Thomasomys* as "large and weakly opisthodont". In material at hand, most incisors of *Delomys* are weakly opisthodont to moderately orthodont. In my view those of *Thomasomys cinereus* are mostly orthodont with a few weakly opisthodont. Most *Delomys* incisors are smaller than those of *Thomasomys*. The weakly opisthodont incisor may be the more primitive.

14. Molar occlusal design. The unworn molars of *Delomys* and *Thomasomys* may be described as basically brachyodont, pentalophodont, tuberculate, and crested bilevel. Every stage of wear causes a change in molar crown design. The lophs of the molar crowns of *Delomys* and *Thomasomys cinereus* (Voss 1993: figs 9, 10) are the well defined lophs of the pentalophodont pattern. No consistent differences in designs of *Delomys* and *Thomasomys* molars exist except for presence of an accessory lophid in *Delomys* that is absent in *Thomasomys cinereus* (see item 16 below, and Hershkovitz 1962: 69 et. seq.).

15. Anterocone or anteromedian flexus. The feature is present in M^1 in both *Delomys* and *Thomasomys cinereus* as described by Voss (1993: 20, 24). Variability of the conules defined by the flexus is discussed in my description of *Delomy dorsalis* (p. [43 ms.]).

16. Ectolophid. The well developed loph between protoconid and hypoconid of m_1 in *Delomys* originates on the labial side of the mure and fuses with the ectostylid of the cingulum. An ectolophid is sometimes present in m_2. The ectolophid is absent in *Thomasomys cinereus* except for an anlage in some specimens. The ectostyle, however, is always present and well developed. It is difficult to judge within the limitations of this comparison whether the ectolophid is primitive or derived. Unlike the mesolophid on the opposite side of the mure, there are no signs of intermediate stages in the genera compared that might point to the direction of change.

17. Number of ribs. Thirteen ribs is the usual number in mammals including *Delomys* and *Thomasomys*. In many, if not most individuals, the number may vary from 12 to 14. The mode, therefore, is 13, one rib more or less may be regarded as within normal or primitive limits.

18. Gall bladder. A gall bladder was found by Voss (1993: 21) in all seven specimens examined of *Delomy dorsalis* but not in "a poorly fixed liver of the only available fluid example of *D. sublineatus*." It was present in the only two available specimens of *Thomasomys cinereus*.

19. Tuberculum of first rib. The articulation is with the transverse process of the seventh cervical vertebra also with first thoracic vertebra as stated by Voss (1993: 9). The number of specimens Voss examined was not given. In a specimen at hand of *Delomys sublineatus* (FM 149629) and another of *D. dorsalis* (MN 31935) the articulation is with thoracic only. In remaining 4 available skeletons of *D. dorsalis*, the articulations are with cervical 7 and thoracic 1.

20. Entepicondylar foramen. The foramen, which provides passage for the median nerve and brachial artery is absent in present material. According to Carleton (1980: 52) "the foramen may be absent in whole groups currently considered monophyletic, e. g., microtines and South American cricetines ... Within the neotomine-peromyscines, the foramen is typically

Table 2: Number of nipples in the species of *Delomys*. Explanation: m6 = 3 pair nipples; m8 = 4 pair nipples (including pectorals).

Taxon	Localitiy	♂	♀	m6	m8
Delomys dorsalis	Caparaó	4	14	14	0
	Iporanga	7	5	3	2
	Teresópolis	0	2	0	2
	Boraceia	8	8	8	0
	Caraguatay	1	2	2	0
Delomys sublineatus	Teresópolis	4	1	1	0
	Iporanga	0	2	0	2

present." The supracochlear foramen, a perforate of the olecranon fossa, common in South American sigmodontines, may be confused with the entepicondylar foramen where the latter is normally absent.

21. Basihyal (basihyoid) without entoglossal process apud Voss (1993: 9). The few sigmodontine hyoids I examined lack an entoglossal process.

Habits and habitat. According to information compiled by Voss (1993), both *Delomys dorsalis* and *D. sublineatus* inhabit wet tropical and subtropical forest floors. His photographs of habitats suggest a preference for lush vegetation. Sympatric *D. dorsalis* and *D. sublineatus* were collected by our group in the humid secondary forests of Iporanga and Apiaí but also in open areas. Only *D. dorsalis* was taken on the dry slope of the Parque Nacional de Caparaó.

Delomys dorsalis Hensel (figs 6, 8, 9, tables 1—4)

Hesperomys dorsalis Hensel, 1872: 42, pl. II, figs 16a upper molar row, fig. 16b lower molar row, fig. 26b (m_2 enlargement from 16b).

Hesperomys dorsalis var. obscura Leche, 1886: 696. Brazil: Rio Grande do Sul (type locality, Taquara do Mundo Novo).

Akodon dorsalis lechei Trouessart, 1904: 434. New name for *Hesperomys dorsalis* obscura Leche, wrongly believed preoccupied by *Mus obscurus* Waterhouse 1834 (a *Necromys* [= *Bolomys*]).

Delomys dorsalis, Thomas, 1917: 196 — classification.

Delomys dorsalis collinus Thomas, 1917: 197 — Brazil: Rio de Janeiro (type locality, Itatiaya, 1800 feet; other specimens from Piquete and Alta da Sierra); holotype, adult male, skin and skull, BM 14.2.23.12.

Holotype. None specified; 7 paratypes collected by Reinhold Hensel include 5 in spirits, 1 skeleton, and 1 skull; the skeletal material and at least 1 spirit-preserved specimen were used in the original description.

The original description of *Delomys dorsalis* is based on the upper and lower molar rows (both figured), the incisors, and 2 skulls. Measurements of the larger of the skulls are basal length 25.5 mm, nasals 13.3 mm, incisive foramina 6.0 mm, interorbital width 5.3 mm; sagittal diameter of interparietal 4.0 mm, frontal 10.4 mm. Vertebral count is 13 thoracic, 6 lumbar, 32 caudal; 17th vertebra diaphragmatic. External measurements of a large spirit-preserved individual are head and body 135 mm, tail 124 mm, and hind foot 27 mm.

The upper and lower molar rows of *Hesperomys dorsalis* figured and described by Hensel (1872: pl. 2, figs 16a, 16b, 26b) are unambiguous representatives of the species and are hereby designated lectotype. The cotypes or paratypes were originally deposited in the Berlin Natural History Museum.

Type locality. State of Rio Grande do Sul, Brazil.

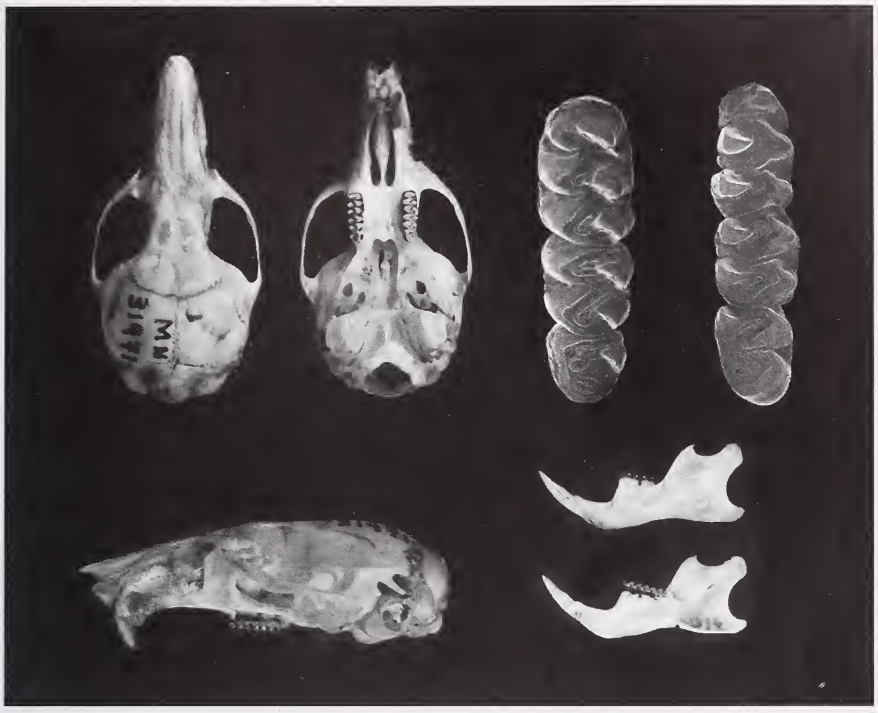


Fig. 6: *Delomys dorsalis* (MN 31971); skull and molars. GSL, 29.7 mm; molars, 4.8 mm.

Distribution. Southeastern Brazil, from Minas Gerais south through the states of Rio de Janeiro, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul, and the province of Misiones, Argentina.

External characters. *Delomys dorsalis* is a medium sized, dark colored, medium to short-tailed, narrow-footed, large eared mouse characterized mainly by a more or less defined blackish middorsal stripe extending from crown or nape to rump or base of tail. Underparts are grayish with thin orange-colored wash, the slaty hair bases usually showing through; division between sides and underparts undefined or marked by a poorly defined, usually broken, orange line from cheeks to tail base. Tail length from about 82 % to 105 % of combined head and body length with average a little under 100 % (table 2); tail thinly pilose, the scales showing through, hair dark brown above, same beneath or with nearly entire ventral surface to one third or one half contrastingly paler; feet long, narrow, whitish above, the short hairs unbanded, the dark skin showing through; mystacial vibrissae usually long, when laid back most vibrissae extend beyond the ears; paired nipples are inguinal, abdominal and postaxial = 6, occasionally a pectoral pair is present to total 8 nipples.

Measurements. See table 3.

Karyotype. 2n = 82 (Zanchin et al. 1992).

Sexual dimorphism. None consistent.

Comparisons. The comparisons are between 67 specimens of *D. dorsalis* of which 49 are from Caparaó, 7 from Iporanga and Apiaí, 7 from Boraceia and 4 from Teresópolis, and 9 of sympatric specimens of *D. sublineatus* of which 4 are from Iporanga and 4 from Boraceia; and 1 from Teresópolis. Altogether a total of 73 specimens were examined.

Table 3: Measurements of *Delomys dorsalis* from Caparaó, Minas Gerais and Iporanga, São Paulo; measurements in mm are of means, extremes, followed by sample size.

Locality	Caparaó ♂	Caparaó ♀	Iporanga ♂	Iporanga ♀
HB[1]	132(111—150)25	128(111—138)20	142(133—158)5	144(135—154)6
Tail length	130(118—146)16	126(118—136)14	139(133—150)4	139(139—141)6
Hind foot[2]	30(26—33)26	30(28—35)24	31(29—32)4	30(29—31)6
Ear[3]	20(18—23)26	21(19—24)24	22(20—23)5	22(21—23)6
CL[4]	30.6(28.4—37.8)21	29.5(27.7—31.8)15	30.8(30.1—31.5)5	30.5(29.0—31.9)6
ZB[5]	16.5(14.4—17.6)21	16.5(15.6—17.1)15	16.7(16.4—17.2)5	16.6(16.3—16.9)6
IB[6]	5.2(5.0—5.5)21	5.2(4.9—5.5)16	5.3(5.2—5.3)5	5.1(5.0—5.2)6
BW[7]	13.8(12.8—14.4)21	13.9(13.1—14.6)15	13.9(13.6—14.3)5	13.9(13.5—14.2)6
NL[8]	13.8(12.7—15.6)21	13.5(12.4—14.4)16	13.8(12.8—15.0)5	13.9(12.3—14.2)6
IF[9]	7.2(6.6—7.5)21	6.9(6.4—7.5)16	7.3(6.8—7.7)5	6.7(6.6—7.0)6
PL[10]	5.3(4.8—5.8)21	5.2(4.7—5.8)16	5.2(4.9—5.3)5	4.9(4.7—5.1)6
UM[11]	5.0(4.8—5.3)21	4.9(4.6—5.2)16	4.9(4.8—5.0)5	4.7(4.6—4.8)6
D[12]	9.1(8.5—9.9)21	8.8(8.0—9.5)16	9.0(8.6—9.3)4	8.9(8.4—9.3)6
R[13]	6.0(5.4—6.5)21	5.8(5.5—6.0)16	6.4(5.9—6.9)4	6.1(5.6—6.4)5
W[14]	47(25—54)25	43(28—51)23	67(58—75)3	58(45—72)6
ZP[15]	3.0(2.8—3.3)21	3.0(2.6—3.5)16	3.0(2.9—3.1)5	2.9(2.5—3.1)6

[1] HB = Head and body; [2] with claw; [3] from notch; [4] CL = Condylobasal length; [5] ZB = Zygomatic breadth; [6] IB = Interorbital breadth; [7] BW = Braincase width; [8] NL = Nasal length; [9] IF = Incisive foramen; [10] PL = Palatal length; [11] UM = Upper molar row; [12] D = Diastema; [13] R = Rostral breadth; [14] W = Weight, grms; [15] ZP = Zygomatic plate.

Pelage of most *Delomys sublineatus* is shorter, coarser, and paler or ochraceous buff, the pheomelanin subterminal band wider. Pale individuals of the Caparaó series of *dorsalis* intergrade with the *sublineatus* from Boraceia.

The distinctive dark middorsal band is present in all *D. dorsalis*, albeit ill defined in many. A well-defined middorsal dark band is likewise present in all *D. sublineatus* from Teresópolis, Iporanga-Apiaí and in 4 of 5 from Boraceia.

The bright lateral line that marks the color separation of sides of body from underparts is nearly always present and well defined in *sublineatus*. It is often present in *D. dorsalis* but usually broken in parts where fur is shaggy. Ears uniformly dark brown in *dorsalis*, paler or partially unpigmented in *sublineatus*; tail always shorter in *sublineatus* (77 % to 92 %) than combined head and body length, and averages shorter than the proportional tail length of *dorsalis* (82 % to 105 %); mystacial vibrissae appear to be thinner and shorter in *sublineatus*, when laid back few extend beyond ears; whitish hairs of dorsal surface of hind feet are entirely unbanded in both species; in some, the darkly pigmented skin shows through giving a dusky appearance to the foot; tail dark brown, slightly paler beneath in some, partially bicolor in others more frequently in *sublineatus* but rarely entirely bicolor; length of outer pedal digits relative to adjacent ones similar in both species.

Cranial characters do not distinguish the species although individual and population differences may be noted (Voss 1993: 27) and a slightly greater size of *sublineatus* compared with sympatric *dorsalis* (Voss 1993: fig. 13). Among dental traits, the anterolabial conule of m^1 in *D. dorsalis* is said to be about the same size as the anterolingual conule. In *D. sublineatus*, however, it is said to be usually smaller. A tabulation of the comparative sizes of the right and left anteroconules in the Caparaó *D. dorsalis* revealed the left with 7 larger, 14 smaller, 10 about equal, 13 indeterminate. Whatever the variation of the anterior conules in *D. sublineatus*, no consistent difference from *D. dorsalis* can be proven. An enterolophid in m_1 is consistently present in both species.

Specimens examined: Total 73. ARGENTINA: Misiones (Caraguatay, FM 11); BRAZIL: Paraná (Roça Nova, 100 m, FM 1); Rio de Janeiro (Teresópolis, FM 2); São Paulo (Boraceia, FM 8; Iporanga, MZUSP 15); Minas Gerais, (Parque Nacional de Caparaó, Arrozal, 2300 m, MN 1; Cachoeira Bonita, 1750 m, MN 17; Pico da Bandeira, 2700 m, MN 2; Segredo,

Fig. 7: *Delomys sublineatus* (PH 10080); skull and molars. GSL, 31.4 mm; molars, 4.8 mm.

2100 m, MN 6; Tronqueira, 1790 m, MN 1; Terreirão, 2400 m, MN 15; Vale Encantado, 2100 m, MN 5).

Delomys sublineatus Thomas (fig. 7, table 4)

Delomys sublineatus Thomas, 1903: 240.

Holotype. Old adult male, skin and skull, British Museum (Natural History) no. 3.9.4.58, collected 14 February 1903, by A. Robert, original number 1224.

Type locality. Engenheiro Reeve, Espírito Santo, Brazil, elevation between 400—600 m.

Distribution. Southeastern Brazil in the States of Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Santa Catarina and Paraná (Voss 1993: 31).

Characters. See comparisons with *D. dorsalis*.

Karyotype. 2n = 72, FN = 90 (Yonenaga 1975: 283).

Nomenclature. The history of the fossil cranium of a *Delomys* recovered by Lund from cave deposits near Lagoa Santa, Minas Gerais, and subsequently described as *Calomys plebejus* by Winge (1887) has been reviewed by Voss (1993: 32). Identification of *plebejus* as a *Delomys*, first made by Avila Pires (1960), was accepted without qualification by Voss. Equation of *plebejus* with *sublineatus*, however, was rejected. Voss (1993: 34) argued that "synonymizing *plebejus* Winge 1887 with *sublineatus* Thomas, 1903 would have the highly undesirable consequence of replacing a type specimen with many characters useful for species discrimination by another with none. Thus, although there is no evidence that the taxon

Table 4: Comparative measurements of *Delomys sublineatus* and *D. dorsalis*.

	sublineatus Iporanga ♂ ♀	*sublineatus* Teresópolis ♂ ♀	*dorsalis* Boraceia ♂ ♀	*dorsalis* Boraceia ♂ ♀
HB[1]	137(126–146)4	124, 124, 138	118(104–135)7	127(113–135)5
Tail length	116, 118	111, 112, 127	136(130–145)4	106(100–115)5
Hind foot[2]	29(28–30)4	29, 30, 31	30(28–31)7	27(25–30)5
Ear[3]	21(20–22)4	20	19(16–20)7	21(20–22)5
CL[4]	30.0(29.0–30.7)4	28.1, 30.3	29.7(28.2–31.0)7	27.9(27.3–28.8)5
ZB[5]	17.1(16.7–17.4)4	15.8, 15.9, 16.3	15.8(14.7–16.5)7	15.7(14.8–16.4)5
IB[6]	5.2(5.1–5.3)4	4.6, 4.9, 5.0	5.4(5.2–5.5)7	4.8(4.7–5.0)5
BW[7]	13.7(13.3–14.3)4	13.0, 13.4	13.7(13.4–13.9)7	12.8(12.6–13.2)5
NL[8]	13.3(13.0–13.7)4	12.5, 12.8, 13.1	13.2(12.7–13.8)6	12.4(11.5–13.5)5
IF[9]	6.6(6.4–6.8)4	6.0, 6.4, 7.1	7.3(6.6–8.1)7	6.4(6.1–6.9)5
PL[10]	4.7(4.3–5.1)4	5.1, 5.2, 5.2	5.0(4.6–5.5)7	5.0(4.7–5.2)5
UM[11]	4.6(4.4–4.7)4	4.5, 4.7, 4.8	4.9(4.7–5.1)7	4.5(4.3–4.7)5
D[12]	8.4(8.0–9.0)4	8.2(7.4–8.7)4	8.7(8.3–9.2)7	7.7(7.3–7.9)5
R[13]	6.1(5.8–6.5)4	6.2(5.6–6.6)4	6.0(5.8–6.2)7	6.0(5.4–6.5)5
W[14]	60(45–83)4	—	—	48.55
ZP[15]	2.9(2.7–3.2)4	2.7, 2.7, 3.2	2.8(2.6–3.1)7	2.8(2.6–3.0)5

[1] HB = Head and body; [2] with claw; [3] from notch; [4] CL = Condylobasal length; [5] ZB = Zygomatic breadth; [6] IB = Interorbital breadth; [7] BW = Braincase width; [8] NL = Nasal length; [9] IF = Incisive foramen; [10] PL = Palatal length; [11] UM = Upper molar row; [12] D = Diastema; [13] R = Rostral breadth; [14] W = Weight, grms; [15] ZP = Zygomatic plate.

represented by the Lagoa Santa fossil is extinct, no biological or nomenclatural purpose is served by synonymizing it with either of the Recent species recognized as valid in this report; *plebejus* is a *nomen dubium* that should be used only in reference to Winge's hypodigm."

Reasons given by Voss for rejection of the name *Calomys plebejus* Lund are personal opinions with justification.

Comparisons. See *Delomys dorsalis* account.

Measurements. See table 4.

Origin and dispersal. Phenetic similarity between *Delomys sublineatus* and *D. dorsalis* is such that specific distinction between the species is usually predicated on karyotypic differences and sympatry. At one time the two species were regarded conspecific, at another only subspecifically distinct. Zanchin et al. (1992: 168) who studied the karyotypes found "very few elements ... shared by them. This mean[s] that not only centric fusions but pericentrimeric inversions and/or complex rearrangements are responsible for the different karyotypes." The rearrangements might have been responsible, among other characters of *sublineatus*, for the short, stiff pelage and selective reduction and partial elimination of the pheomelanin banding of the individual hairs of back and sides.

Specimens examined: Total 15. Rio de Janeiro (Fazenda Boa Fe, FM 1; Teresópolis, FM 4); São Paulo (Boraceia, FM 5; Cotia, FM 1; Iporanga, MZUSP 4).

Akodon Meyen

Akodon Meyen, 1833. Type species *Akodon boliviensis* Meyen, 1833: 600, pl. 43.

The three species of *Akodon* taken on the western slope of Mt. Caparaó are *A. cursor* Winge and *A. serrensis* Thomas, both members of the large-size *A. mollis* group, and a heretofore undescribed species of the small-size *A. boliviensis* group. The size

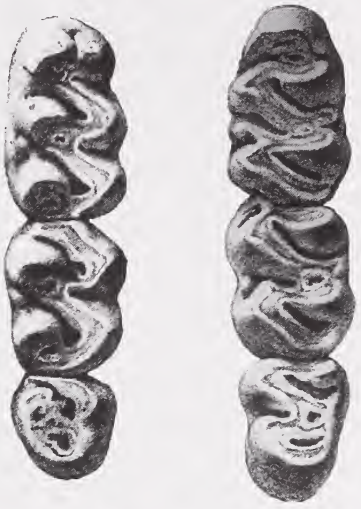


Fig. 8: *Delomys dorsalis* Hensel, 1872; upper molar row, 4.5 mm; lower, 4.9 mm (figure and measurements from original description of lectotype).

categories have been defined by Hershkovitz (1990b). The two large species overlap in most dimensions but otherwise are readily separable. The smaller non-intergrading third species differs unmistakably from the others and is described below as new.

Akodon serrensis Thomas (figs 11, 13, table 6)

Akodon serrensis Thomas, 1902: 61.

Holotype. Male, skin and skull, British Museum (Natural History) no. 3.7.1.69 collected 15 August 1901, by A. Robert, original number 803.

Type locality. Roça Nova, Serra do Mar, Paraná, Brazil, elevation between 930—1150 m.

Distribution. Southeastern Brazil, and in the Province of Misiones, Argentina (Justo and Santis, 1977). *A. serrensis* and *A. cursor* were taken in collecting stations Vale Verde, Minas Gerais, and Pedro Roxa, Espírito Santo.

Characters. Pelage deep, lax, the new pelage of dorsum dark reddish or chestnut with the dark brown or blackish bases showing through increasingly with age; underparts with bright orange wash over otherwise exposed dark bases; lateral line not sharply defined; chin, throat bare except for whitish chin patch; tail dark brown above, slightly paler beneath; pedal claws relatively short, fine, recurved, the digital bristles sparse, scarcely extending beyond tip of claw; manual claws slightly shorter, bristles fewer and shorter.

Karyotype. Diploid number 44 (Liascovich & Reig 1989), highest known for the *A. mollis* group.

Comparisons. Distinguished from *Akodon cursor* by overall smaller size, lax, darker pelage particularly on underside, minute manual claws, larger molars, palatine and maxillary bones more inflated particularly where visible through openings of the palatal foramina.

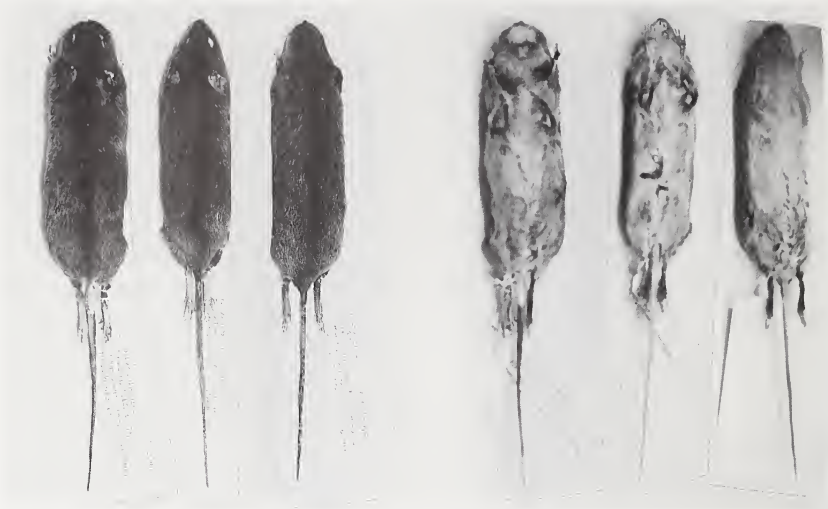


Fig. 9: Skins of *Delomys sublineatus* showing dark middorsal stripe. All specimens from São Paulo, Brazil. From left to right, dorsal and ventral, MZUSP 26961, FM 26595, FM 141628.

Fig. 10: Skins of *Delomys dorsalis* showing dark middorsal stripe. All specimens from Brazil, Minas Gerais, Parque Nacional de Caparaó. From left to right, dorsal and ventral, MN 31934, PH 10089, PH 10373.

Fig. 11: *Akodon serrensis* (MN 32102) skull and molars. GSL, 27.2 mm; molars, 5.4 mm.

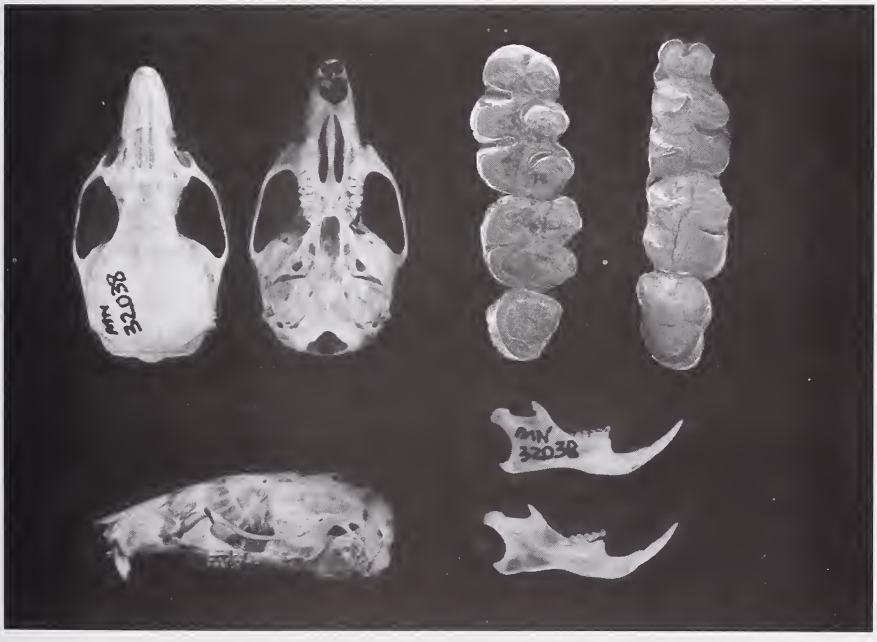


Fig. 12: *Akodon cursor* (MN 32038) skull and molars. GSL, 28.2 mm; molars, 4.5 mm.

Table 5: Selected measurements from Winge (1888: pl. 1, fig. 6) of the figured skull of *Akodon cursor* followed by those of his paratypes.

Greatest skull length	29.5, 28.3
Upper molar row	4.75
Diastema	8.5, 8.3, 7.25, 8.5, 8.0, 8.3, 8.5, 7.67
Length of bulla	4.75
Palate between m^{2-2}	3.0
Incisive foramen	7.33, 7.0, 6.67, 7.3, 7.25, 7.0, 7.25, 6.5
Nasals, length	13.0, 12.67, 11, 13, 12.67
Frontal suture	10.0
Interparietal suture	5.5
Mandible length	16, 14.5, 16.3, 16

Table 6: Sexes compared of Caparaó *Akodon serrensis* and *A. cursor*.

	serrensis ♂	*cursor* ♂	*serrensis* ♀	*cursor* ♀
Head and body	105(92–116)28	124(103–157)25	106(95–115)19	111(101–127)19
Tail	84(78–93)21	95(81–106)23	85(78–94)10	92(81–110)16
Hind foot (c.u.)	25(23–27)25	25(23–28)18	25(24–28)19	25(23–27)20
Weight	30(23–45)28	50(33–65)27	28(18–40)21	35(23–55)19
Condylobasal length	26.0(24.5–26.2)14	28.9(26.3–30.4)22	25.5(24.4–26.6)14	26.7(25.4–27.2)10
Molar row	5.1(5.0–5.5)13	4.5(4.0–4.9)21	4.9(4.4–5.4)14	4.5(4.2–4.8)16

Specimens examined: Total 67. Minas Gerais (Parque Nacional de Caparaó, Pico da Bandeira, 2700 m, MN 7; Tronqueira, 1970–2000 m, MN 4; Terreirao, 2400 m, MN 17; Cachoeira Bonita, 1750 m, MN 21; Segredo, 2100 m, MN 9; Vale Encantado, 1980 m, MN 1; locality? MN 1; Arrozal, 2300 m, MN 1; Vale Verde, 1400 m, MN 1; Casa de Julio, MN 1); Espírito Santo (Pedra Roxa, 1100 m, MN 1).

Akodon cursor Winge (figs 12, 13, tables 5, 6)

Habrothrix cursor Winge, 1887: 25, pl. I, fig. 5 (hindfoot), pl. II, fig. 6 (skull).

Lectotype. Winge's figured skull, basis for the original cranial description, is preserved in the Copenhagen Museum.

Syntypes. The original description is derived from a number of skins, skulls and skeletons preserved in the Universitets Zoologiske Museum, Copenhagen. Ximénez et al. (1972) list the following as syntypes: ZMK 221, 222, 224, 237, 6-VIII-1847 ♀, 5-VIII-1847 ♀, 29-VI-1851, the last three collected by Reinhardt, and an unlisted unnumbered specimen from the Lund collection. Thomas (1902: 60) noted that "one of the co-types . . . [is] in the British Museum."

Type locality. Lagoa Santa, Minas Gerais, central Brazil.

Distribution. Southeastern Brazil from Bahia south, and the central plateau; Uruguay, eastern Paraguay, and Misiones in northeastern Argentina.

Fig. 13: *Akodon cursor* and *A. serrensis*, skulls and molars compared. See figures 11, 12 for data.

Characters. Pelage soft, deep, adpressed; upper parts individually variable from buffy to dark brown; a poorly defined dark longitudinal band sometimes present middorsally, sides paler, the pheomelanin subterminal band of hairs wider, underparts like sides, lateral line of separation absent but slaty basal portion of hairs showing through weakly; muzzle tip more or less dark brown; tail dark brown, thinly covered with short stiff, blackish hairs, the scales fully exposed; cheiridia brown, digits often whitish; ears short, brown; claws short, weak, hardly one phalanx long, middle digits narrowly webbed.

Karyotype. Diploid number, 24 (Liascovich & Reig 1989), lowest known for the *A. mollis* group.

Measurements. Table 6.

Specimens examined: Total 53. Minas Gerais (Parque Nacional de Caparaó, Centro Visitantes, 1300 m, MN 18; Vale Verde, 1400 m, MN 22; locality unrecorded, 3); Espírito Santo (Pedra Roxa, 1100 m, MN 10).

Akodon mystax, new species (figs 14, 15, 16, 24, table 7)

Holotype. Adult female, skin and skull Museu Nacional, Rio de Janeiro, no. 31910, collected 26 October 1992, by Philip Hershkovitz, Scott M. Lindbergh, Alfredo Langguth and Barbara E. Brown; original number, PH 10425.

Etymology. The blackish band from tip of rostrum to corner of each eye in many males and fewer females suggests a mustache.

Type locality. Arrozal, Pico da Bandeira, western slope Mt. Caparaó, Minas Gerais, Brazil, elevation 2300 m.

Distribution. Known from type locality only; captures were at 2300 m, 2400 m, and 2700 m on the western slope of Mt. Caparaó, Minas Gerais, Brazil.

Diagnosis. Thin dark rostral band (mustache) usually present, cheiridea unpigmented, tail bicolor; infraorbital foramen and zygomatic plate hardly visible viewed from above; mesopterygoid fossa wide with posterior palatal margin rounded or square; incisive foramina long, the palatal tips rounded, turned outward.

Description of holotype. Coloration of dorsum from snout to rump brown, the cover hairs with fine blackish tips, followed by a narrow ochraceous orange subterminal band, the bases dark gray; sides paler, the pheomelanin subterminal band wider, the color dominant on ventral surface but with plumbeous basal portions of hairs exposed; tail brown above, sharply paler beneath; dark rostral band present from snout to side of face; ears brown, cheiridea unpigmented; length of digits normal, claws short, unspecialized.

Variation. Pelage deep, fine, almost lax, about 10 mm long on back; dorsum from rostrum to tail base buffy to grayish brown, the subterminal band of hairs buffy to ochraceous becoming paler toward sides of body; underparts paler, with an ill-defined lateral ochraceous buff line of demarcation, the slaty hair bases showing through; tip of rostrum usually with narrow dark brown patch often extending across each side as a mustache to or near corner of eye; ears brown, in some rimmed pale buff; cheiridia pale above and below; first manual digit with nail not extending to base of second digit; digit II with claw extending to base of 2nd phalanx of III; digit IV slightly shorter than III, V with claw extending to base of 3rd phalanx of IV; pedal digit I with claw extending to middle of 1st phalanx of II; length of digits II, III, IV, subequal, the middle slightly longer; interdigital membranes absent; claws short, recurved, the pedal longer than the manual; tail distinctly bicolor, the hairs nearly concealing the scales. The general aspect is of a grayish buffy animal.

Sexual dimorphism. Males are larger than females in external dimension and tend to have slightly larger skulls (table 6). Most size differences in this case, however, are inconsequential; blackish rostral patch or mustache in nearly all males, is less prevalent and extensive in females.

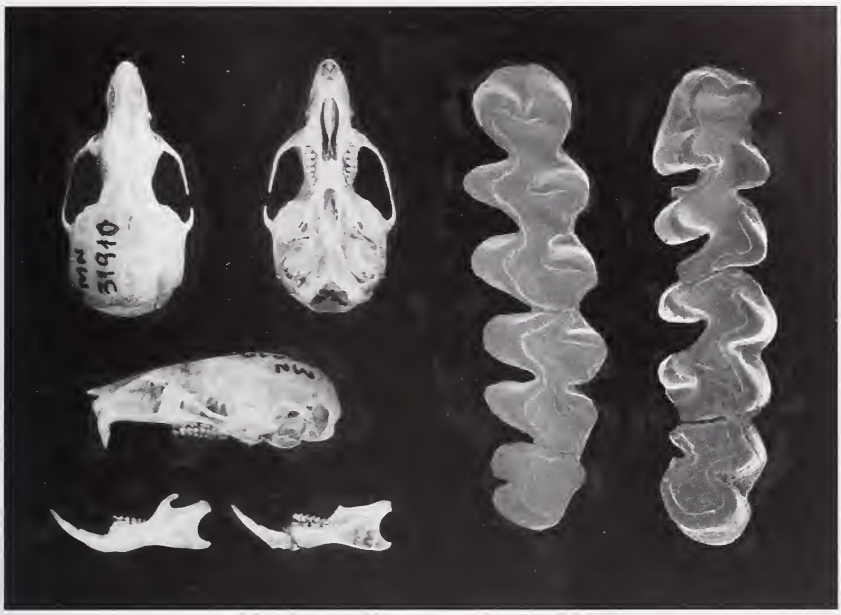


Fig. 14: Mustached Akodon, *Akodon mystax* (holotype MN 31910 ♀); skull and molars; GSL, 24.3 mm; molars, 3.9 mm; Arrozal, Parque Nacional de Caparaó, Minas Gerais.

Comparisons. *Akodon mystax* is a member of the *Akodon boliviensis* group or size class defined by Hershkovitz (1990b: 3). Males of all species of the *boliviensis* group are larger than females in external dimensions. Nearest relatives appear to be *Akodon sanctipaulensis* (São Paulo), *A. lindberghi* (Brasília, D. F.), and *A. azarae* (Paraguay, Argentina and Uruguay). Similarities between Andean and Atlantic region akodonts of the *boliviensis* group may be more than superficial, but the diagnostic characters of *mystax* are significant; the karyotype is as yet unknown. The posterolophule (pseudomesoloph) often fused with the posterostyle usually absent in *A. mystax* is not consistently present in other species.

Morphometric differences between the species are slight; comparative measurements of most other members of the *boliviensis* size class are given by Hershkovitz (1990b: 4—5).

Measurements. Table 7.

Remarks. Several of the specimens were taken in a small stone house in Terreirao occupied only by the mice until Scott Lindbergh and Alfredo Langguth moved in. A mustache like that of *Akodon mystax* is common among sigmodontines, marsupials and other mammals usually as an individual variable.

Specimens examined: Total 21. Minas Gerais (Parque Nacional de Caparaó, Terreirao, 2400 m, MN 13; Arrozal, 2300 m, MN 5; Pico da Bandeira, 2700 m, MN 3).

Thaptomys Thomas

Thaptomys Thomas, 1916: 339. Type species *Hesperomys subterraneus* Hensel, 1872 (= *Thaptomys nigrita* Lichtenstein, 1829).

The genus *Thaptomys* Thomas, 1916, one of the most distinctive of the akodontine assemblage has experienced an equivocal systematic history. Ellerman (1941: 406, 409) characterized *Thaptomys* as "quite a well differentiated group," but treated it

Table 7: Measurements of *Akodon mystax* compared with *A. azarae* and *A. boliviensis*.

	mystax[1] Holotype ♀	*mystax*[2] ♂	*mystax*[2] ♀	*azarae*[3] ♂	*azarae*[3] ♀	*boliviensis*[4] ♂	*boliviensis*[4] ♀
Head and body	92	95(85–101)11	90.4(87–99)8	102(94–113)9	97(92–101)7	98(92–100)5	96(83–107)6
Tail length	64	67(63–73)11	63.7(59–68)8	65(57–72)9	62(57–67)7	72(62–82)5	70(64–77)6
Hind foot	17	19(17–22)11	17.6(16–19)8	20.5(20–21.5)9	20(19–20.5)7	21(20–23)6	21(19–22)6
Ear	12	13(12–14)11	13(12–14)8	—	—	—	—
Weight	—	19(16–25)12	18(13–26)7	—	—	—	—
Greatest skull length	24.3	24.6(24.0–25.4)11	24.3(23.6–24.6)8	24.7(23.8–26.1)9	23.8(22.8–24.7)8	25.1(24.5–26.0)5	24.5(24.1–25.0)6
Condylobasal length	22.9	23.2(22.5–24.0)10	22.6(22.0–23.2)7	22.9(21.9–24.6)9	21.9(20.8–23.2)8	23.2(22.4–24.0)5	22.7(21.9–23.6)6
Zygomatic breadth	12.4	12.1(11.5–12.7)9	11.9(11.6–12.4)8	12.1(11.3–12.6)9	12.0(11.4–12.6)8	12.4(11.8–12.9)6	12.2(11.9–12.5)6
Interorbital width	4.5	4.5(4.4–4.6)11	4.4(4.1–4.6)8	4.0(3.8–4.3)9	4.1(3.9–4.5)8	4.5(4.2–4.7)6	4.4(4.3–4.6)6
Braincase width	10.9	10.9(10.5–11.3)11	10.9(10.5–11.2)8	11.1(10.9–11.6)9	11.2(10.7–11.6)8	11.4(11.2–11.7)6	11.4(11.1–11.5)6
Nasal length	9.0	8.9(8.3–10.7)12	8.6(8.0–9.0)8	9.0(7.8–9.5)9	8.9(8.2–9.5)8	9.4(8.0–10.6)5	9.0(8.3–9.9)6
Incisive foramen	6.9	6.8(5.7–7.3)12	6.7(6.4–6.7)8	6.1(5.8–6.5)9	5.9(5.6–6.4)8	6.1(5.8–6.5)5	5.8(5.5–6.1)6
Palate, length	2.7	2.8(2.6–3.0)11	2.8(2.7–3.0)8	3.3(3.0–3.6)9	3.1(2.8–3.3)8	3.3(2.9–3.8)6	3.2(3.1–3.5)6
Zygomatic plate	1.8	1.8(1.6–2.0)12	1.7(1.3–2.1)8	2.3(2.1–2.5)9	2.1(1.9–2.3)8	2.0(1.7–2.3)6	2.0(1.8–2.4)6
Molar row	3.9	3.9(3.5–4.2)12	3.9(3.6–4.3)8	4.2(4.1–4.3)9	4.0(3.8–4.2)8	3.8(3.5–4.0)6	3.9(3.7–4.5)6
Diasteme	6.4	6.5(6.2–6.8)12	6.3(6.0–6.4)7	—	—	—	—
Rostrum, width	4.4	4.8(4.4–5.0)7	4.3(4.2–4.7)8	4.2(3.9–4.5)9	4.2(4.0–4.4)7	4.5(4.4–4.7)5	4.3(4.2–4.5)6
Mesopterygoid fossa	1.54	1.53(1.40–1.64)5	1.49(1.39–1.54)7	1.3(1.0–1.6)9	1.3(1.0–1.5)6	1.3(1.1–1.4)6	1.3(1.0–1.8)5

[1] *Akodon mystax*, BRAZIL: *Minas Gerais* (Caparaó National Park, Arrozal, 2300 m), MN 31910
[2] *Akodon mystax*, BRAZIL: *Minas Gerais* (Caparaó National Park, 2300–2700 m) MN
[3] *Akodon azarae*, ARGENTINA: *Buenos Aires* (Torrecita) FM
[4] *Akodon boliviensis*, PERU: *Puno* (Limbani) FM.

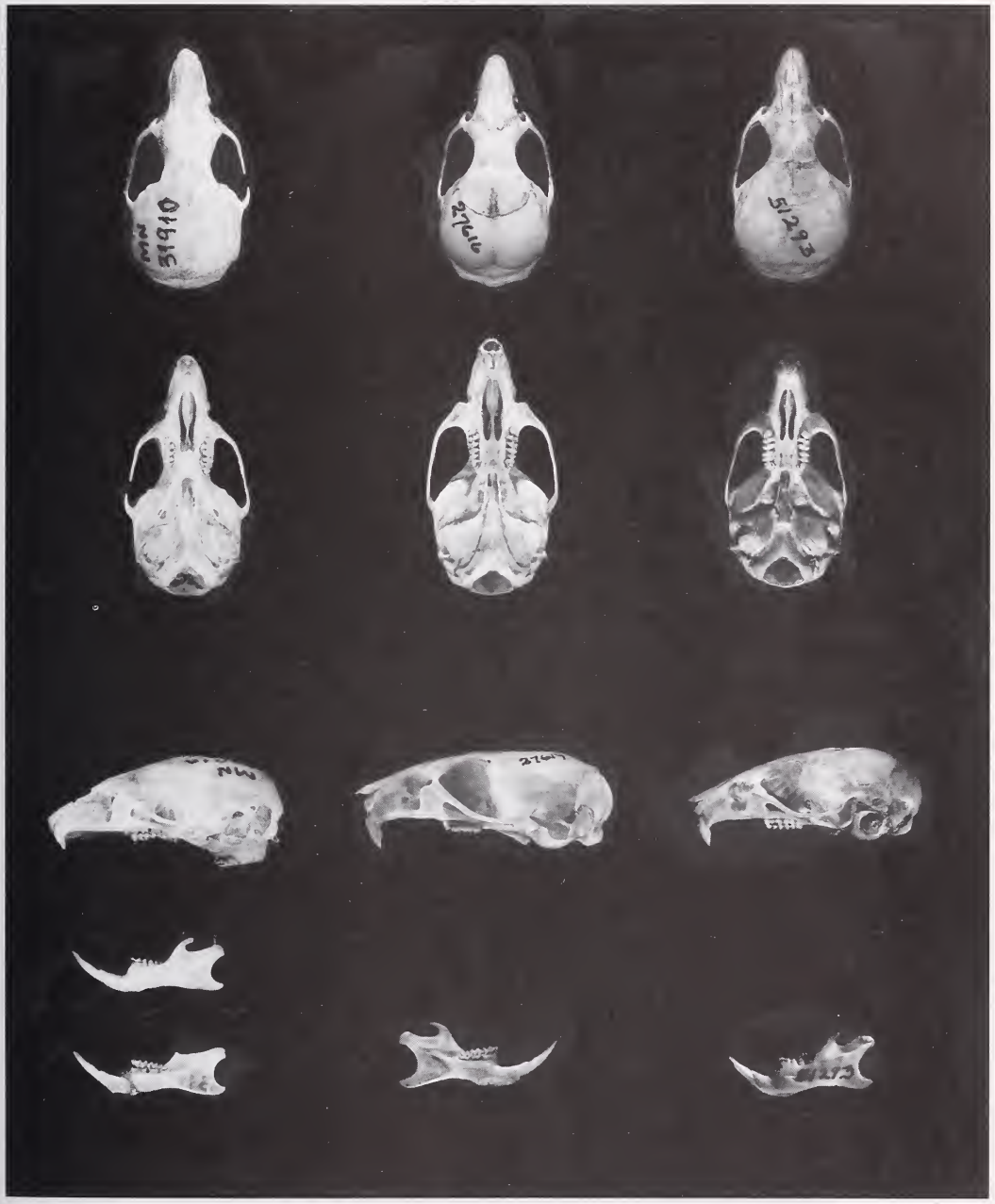


Fig. 15: Skulls of three species of *Akodon*: A, *A. mystax* (holotype MN 31910 ♀); GSL, 24.3 mm; Arrozal; B, *A. azarae* (FM 27616 ♂), GSL, 23.9 mm; Uruguay, La Lata; C, *A. boliviensis* (FM 51293 ♀); GSL, 24.0 mm; Perú, Puno, Yunguyo.

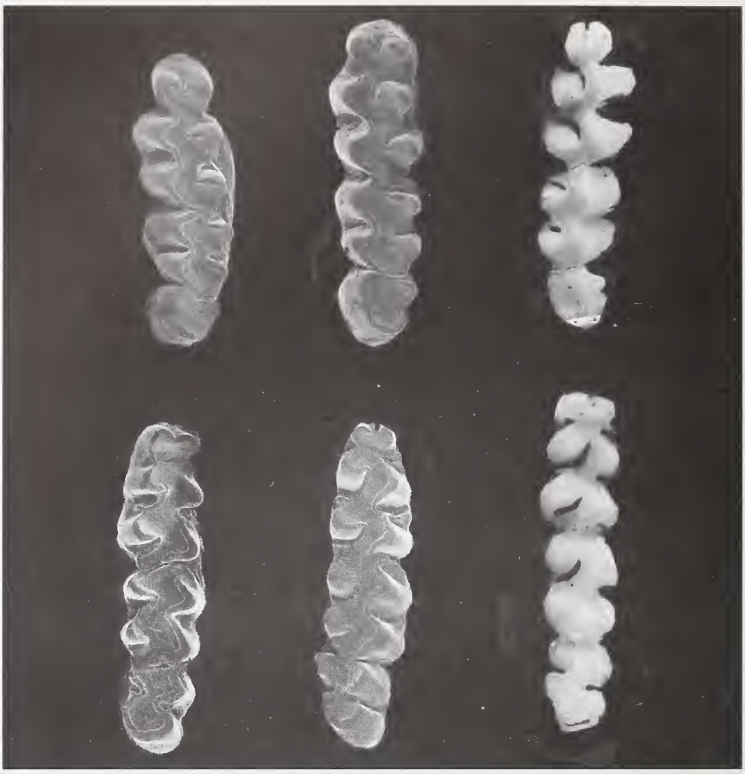


Fig. 16: Molars of three species of *Akodon*, same shown in figure 15. Upper row, upper molars, A, *A. mystax*, 3.9 mm; B, *A. azarae*, 4.0 mm; C, *A. boliviensis*, 4.0 mm; Lower row, lower molars, *A. mystax*, 4.0 mm; *A. azarae*, 4.1 mm; *A. boliviensis*, 4.0 mm.

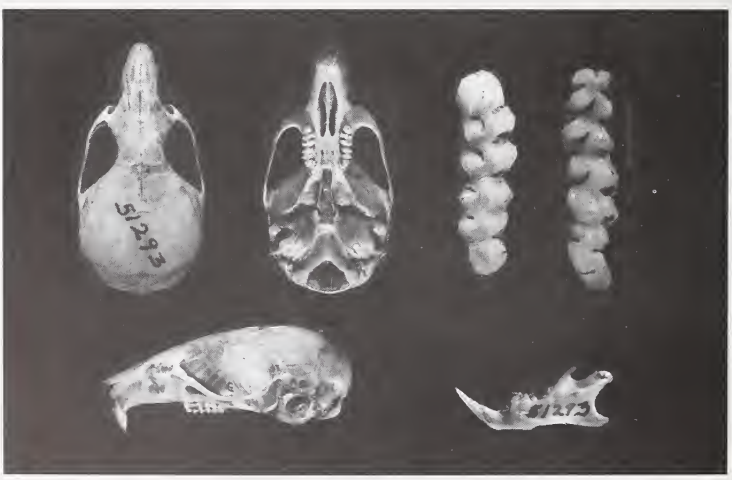


Fig. 17: Bolivian *Akodon boliviensis* (FM 51293); skull and molars; GSL, 24.0 mm; molars, 4.0 mm; Perú, Puno, Yunguyo.

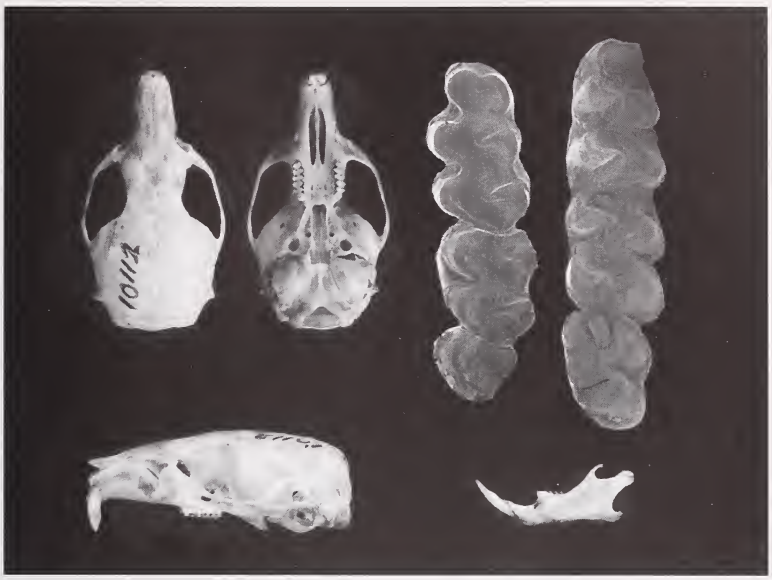


Fig. 18: *Thaptomys nigrita* (PH 10112 ♂); skull and molars; GSL, 24.5 mm; molars, 3.6 mm; Pico da Bandeira, Parque Nacional de Caparaó, Minas Gerais.

as a subgenus of *Akodon*. Cabrera (1961: 453) followed without comment. Reig (1987: 358), with judgement derived from unrevealed sources declared that "separation of *Thaptomys* from *Akodon* s. s. is unwarranted." Nothing, he averred, distinguishes the taxon "beyond the limits of variation with *Akodon* s. s."

The peculiarity of a single pair of prostate glands in *Thaptomys nigrita* was not appreciated by Reig, and the highly advanced fossorial adaptations of the mouse (table 12) were dismissed as "alleged," and "too incipient to deserve any special taxonomic treatment." It has since been shown (Hershkovitz 1990b: 6), "that the short tail, long manual claws, heavy skull, ridged parietals, short, thick rostrum with long nasal bones, wide interorbital region, squared braincase, relatively small molars, long powerful proodont incisors projecting well beyond the nasals, and the diploid chromosome number 52, are singly or in any combination definitely non-*Akodon*." Musser & Carleton (1993: 691) however, retained *Thaptomys* in the synonymy of *Akodon*.

Thaptomys nigrita Lichtenstein (fig. 18)

Mus nigrita Lichtenstein, 1829 p. 35, fig. 1 (animal). Thomas 1902: 62 — synonyms: *subterraneus* Hensel 1872, *henseli* Leche, 1886, *fuliginosus* Wagner, 1845, *orycter* Lund, 1841.

Holotype. Male, skin only, Zoological Museum, Berlin.

Type locality. Vicinity of Rio de Janeiro, Brazil.

Distribution. Southeastern Brazil from the State of Bahia south through Minas Gerais, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul into eastern Paraguay, and in Argentina, the province of Misiones.

Table 8: *Thaptomys nigrita*: Measurements from three localities.

Localities	Pico de la Bandeira Caparaó, MG[1]	Iporanga, SP[2]	Espírito Santo[2]
Head and body	101(95–107)11	103(97–105)9	99(82–116)7
Tail	46(40–50)11	47(42–50)9	42(30–50)7[4]
Hind foot	19(17–21)11	18.5(17–23)9	19(16–20)7
Ear	10(10–12)11	11.5(10–12)8	11(10–12)7
Weight	22(13–29)11	25(17–30)4	26(20–31)4
Greatest skull length	24.1(23.3–24.7)5	25(22.7–25.4)6	24.5(23.9–25.3)7
Condylobasal length	23.6(22.5–24.3)6	24.2(21.4–25.0)6	24.0(22.8–25.0)7
Zygomatic breadth	13.2(12.5–13.6)6	13.4(12.1–14.2)6	13.4(12.8–13.9)6
Interorbital breadth	5.0(4.4–5.3)6	4.9(4.7–5.0)8	5.1(4.8–5.3)7
Braincase width	11.1(10.7–11.8)6	11.7(11.5–12.0)8	11.7(11.3–12.1)7
Nasal length	8.5(8.2–8.7)5	8.8(7.5–9.2)8	9.2(7.5–10.2)6
Incisive foramina	5.8(5.2–6.7)6	5.5(4.8–6.0)9	5.3(4.9–5.8)7
Palatal length	3.9(3.6–4.7)6	3.7(3.3–4.4)8	3.9(3.7–4.1)7
Zygomatic plate	2.4(2.1–2.5)6	2.3–(2.0–2.6)8	2.4(2.1–2.7)7
Molar row	3.7(3.6–3.8)6	3.7(3.5–4.1)9	3.7(3.6–3.8)7

[1] MN and FM; [2] MZUSP and FM; [3]Includes MN: Caira Laguna, Santa Teresa, 3; Castelo, 3; Cachoeira de Hapanurim, 1; [4] Includes some "bobbed-tailed" specimens.

External. One of the smallest mammals of the Caparaó region; pelage velvety, coloration brown, ranging from a milk chocolate color to a dark brown on dorsal surface; sides and underparts with orange, the dark slaty hair bases showing through; forwardly directed pelage of neck and throat with less orange; tail half or less length of head and body combined, the short stiff hairs brown above, whitish below, not concealing scales; ears short, eyes small; manual claws long, fine, the middle pair longest, pedal claws shorter.

Eight teats are said to be the norm for *Thaptomys* (Hensel 1872; Gyldenstolpe 1932; Davis 1947: 6). I count 6 in 2 Caparaó females, 6 in 3 of the FM collection but nipples, especially the pectorals, are difficult to detect in dry skins during the wrong time of the breeding season.

Cranial. Rostrum short, nasals not extending to front of incisors; supraoccipital bone inclined forward; zygomatic arches delicate, the perpendicular plate broad, visible from above; interorbital borders smooth, slightly concave and divergent; incisive foramina longer than molar row and extending to plane of metacones of first molars; palate long, extending behind to level of third molars; posterolateral palatal pits present but highly variable in size; sphenopalatine vacuities absent or not indicated.

Dental. Upper incisors proodont extending well anteriad to tips of nasal bones; molars moderately high crowned; unworn crowns terraced, anteromedian flexus well defined, the procingulum biconulate; talon and trigon of M^{1-2} subequal in width and length, without postcingulum; paralophule (pseudo-mesoloph) usually fused with metalophule; third molar about as large as talon of second, cusps of opposite sides oblique; first lower molar with anteromedian flexid, opposing cusps oblique; protolophid and posterolophid present; posteroflexid of m_3 absent.

Worn upper and lower crowns acquire the typical akodont dished-out eight-shape appearance.

Measurements. Table 8.

Remarks. The later named forms of *Thaptomys* (*fuliginosus* Wagner, 1845; *subterraneus* Hensel, 1872; *henseli* Leche, 1886) were distinguished by coloration only, and the fossil *orycter* Lund (1841) by cranial characters. The traits are highly variable, none consistently distinctive of any one described form.

The abbreviated rostrum and thick, projecting proodont incisors appear to be adaptations for tunnel burrowing.

Comparisons. Small size, one of smallest of Caparaó mammals, markedly proodont incisors, short thick rostrum and long manual claws among other characters distinguish *Thaptomys* from all other mammals of the region.

Habits and habitat. In his description of *Hesperomys subterraneus* (= *Thaptomys nigrita*) from Rio Grande do Sul, Hensel (1872: 45) noted that the species lived in virgin forest and made burrows like that of the European *Arvicola arvalis* (= *A. terrestris*). Whether or not it nested in family groups like the microtine was not mentioned.

The home range of southeastern Brazilian marsupials and mice was estimated by Davis (1945: 124) by recapturing marked animals in second-growth forest near Teresópolis, Rio de Janeiro. The three common species, *Delomys dorsalis, Akodon arviculoides* and *Thaptomys nigrita* were recaptured a total of 152 times. Only 15 individuals were recaptured more than 100 m along the trail between farthest capture sites. The data led Davis to assert that the radius of the home range of each of these species was less than 100 meters.

In a second, more detailed account, Davis (1947: 6) described *Thaptomys nigrita* as an aggressive little mouse, "the second [after *Akodon arviculoides*] most common mammal in the forests [around Teresópolis, Rio de Janeiro]. It is found under logs and tree roots and even makes tunnels in the leaf litter and soft earth. When released alive from the hand it immediately washes its face and cleans its fur and then disappears in a hole. This mouse is very fierce and quickly inflicts a sharp bite when handled. However, several were trained to come out of their holes to look for kernels of grain; they did not eat outside the hole, but grabbed the seed and ran back into the hole. This species is definitely diurnal, for many individuals were captured in the daytime and were regularly seen in the daytime. One mouse was caught 3 times in one afternoon. The sex ratio was about even (80 males and 75 females). There are 4 pairs of mammae. Only 4 pregnant females were examined; 1 had 3 embryos, 2 had 4, and 1 had 5. This little mouse has no conception of climbing, but when placed on a limb runs in any direction and falls to the ground. Recaptures of marked individuals indicate that these mice stay in one place for a long time."

A test for burrowing was made with an adult I captured live at the mouth of a burrow 30 November 1989 in second-growth forest fringing a banana patch in the Iporanga state park. The mouse was introduced into a 12x12x12 wire mesh cage filled nearly to the top with clay. The animal burrowed the instant freed and in seconds dug itself out of sight. The finished tunnel system had three outlets. The first was on top where excavation started. The other two were each at opposing corners of the cage. The mouse was fed corn kernels, peanuts, seeds, and watermelon deposited inside the cage. All was taken into the burrow for eating. The mouse came frequently out of hiding during the day. When frightened it dived into the nearest hole each about 2 inches in diameter but the mouse could negotiate a tunnel a centimeter wide.

Specimens examined: Total 24. Minas Gerais (Parque Nacional de Caparaó, Segredo, 2100 m, MN 1; Vale Verde, 1400 m, MN 4; Cachoeira Bonita, 1750 m, MN 3; Terreirao, 2400 m, MN 3; Pico da Bandeira, 2700 m, MN 1). São Paulo (Iporanga, MZUSP 10).

Brucepattersonius, new genus (figs 19—26)

Type species. *Brucepattersonius soricinus* (new species).

Etymology. The genus is named in honor of Bruce D. Patterson as an expression of my admiration for his mastery of all aspects of mammalogy whether in the field, laboratory or classroom, and in appreciation for his valued friendship.

Included species. *Oxymycterus iheringi* Thomas and the following described as new: *B. soricinus* (type species), *B. igniventris, B. griserufescens, B. albinasus,* and an unnamed species (not seen) from Misiones, Argentina.

Diagnosis. Head and body combined less than 140 mm; tail from shorter to a fourth longer than head and body combined; eyes minute; rostrum long, tapered; longest manual claw 3 mm or less, pedal 1 or 2 mm longer than manual; digital

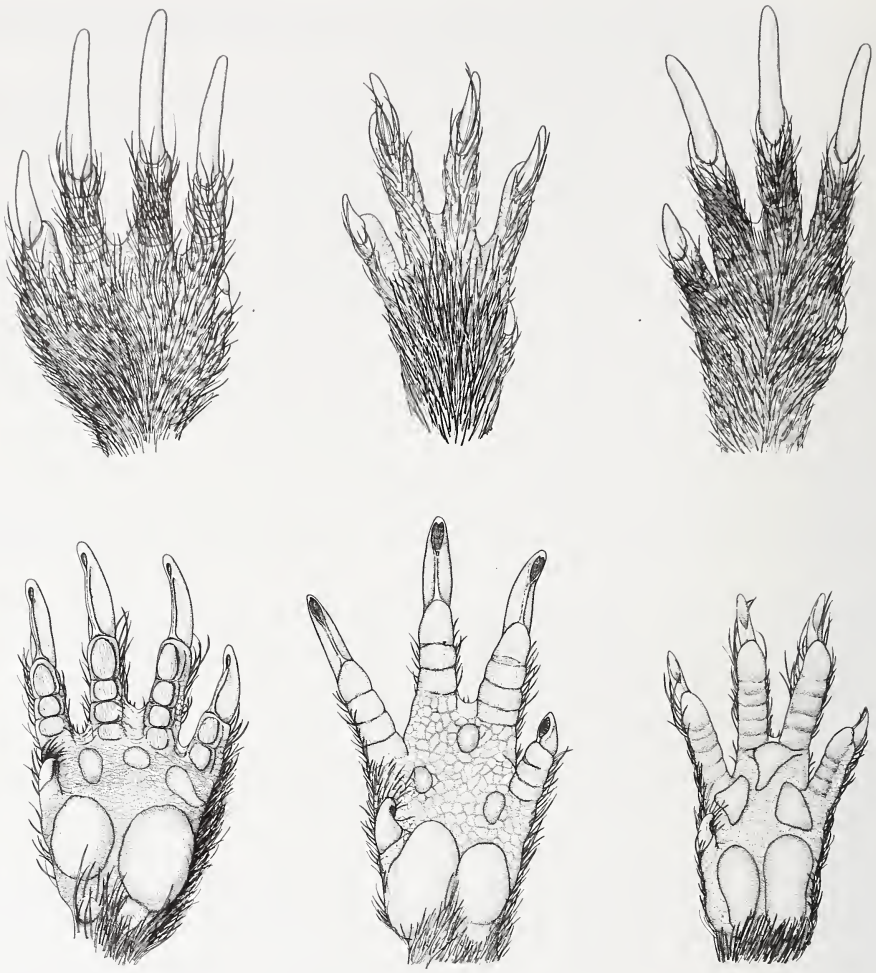


Fig. 19: Left hands of sigmodontine rodents. Upper row dorsal surface, from left, *Chelemys megalonyx*, fossorial; *Oxymycterus amazonicus*, nonfossorial surface digger; *Brucepattersonius griserufescens*, terrestrial semiscansorial. Lower row, palmar surface of same hands in same order as shown above.

vibrissae on three middle manual digits extremely sparse or absent on digits I and V; sphenopalatine vacuities absent; nasals produced anteriorly to or beyond plane of incisors, tips rounded or bluntly pointed; rostral width less than that of interorbital region; molars tetralophodont, quadritubercular, hypsodont; first molar with anterior median fold; mesoloph(id) present to absent; upper incisors short, narrow, orthodont; cuspids more or less subprismatic.

Distribution. Southeastern Brazil from the state of Rio Grande do Sul north into eastern Minas Gerais and probably some part of Espírito Santo; in Argentina known from the province of Misiones.

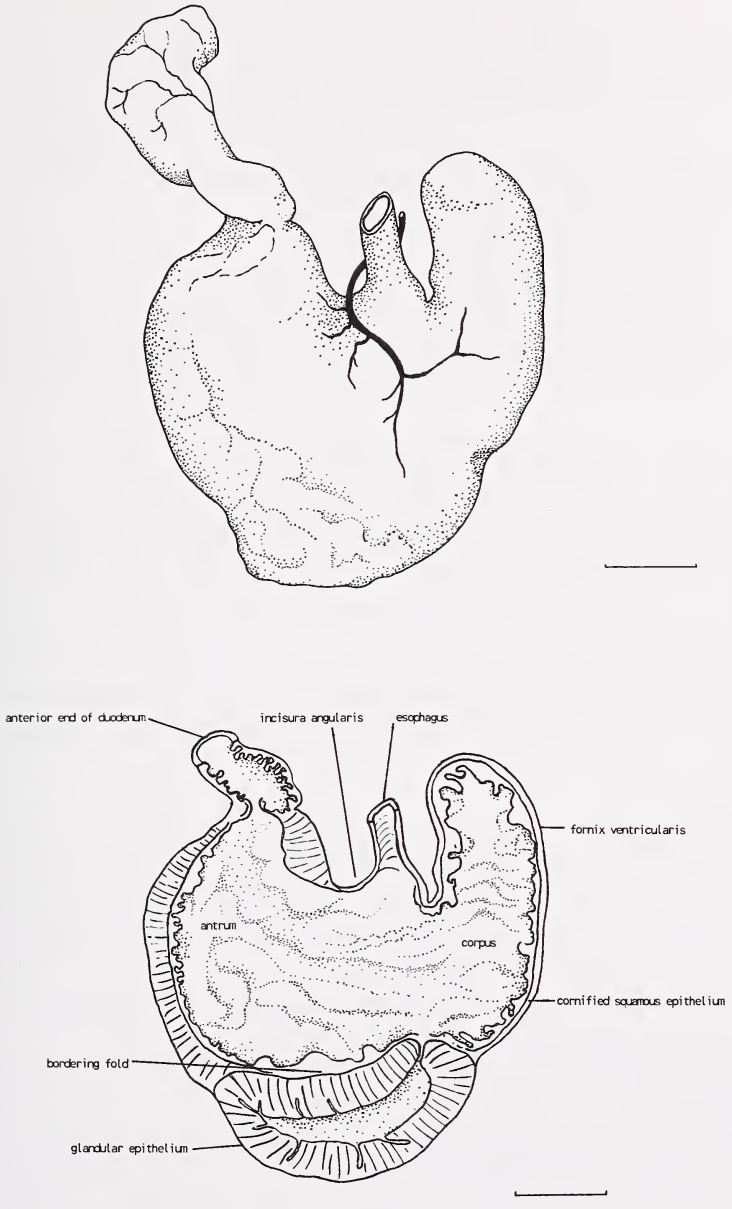


Fig. 20: Unilocular-hemiglandular stomach of *Brucepattersonius griserufescens*; A, ventral aspect; B, the same bisected, the ventral half removed.

Description. Length of head and body combined (HB) between 75—140 mm; tail between 75—120 mm; ear about 14 %—20 % HB; hind foot with claw between 23 %—28 % HB; adult weight between 18—50 g; general coloration of dorsum dark brown, sides of body usually paler with greater admixture of pheomelanin; underparts and inner sides of limbs dominantly grayish or dominantly ochraceous orange (pheomelanin); rostrum long, tapered, eyeballs small, diameter 1 to 2 mm; hind foot long, narrow, base of middle digits webbed; volar pads 6; pedal claws 3—4 mm; manual claws weak, longest 2—3 mm; manual digit I vestigial, inungulate; gall bladder present; stomach unilocular-hemiglandular with glandular epithelium contained in a pouch-like diverticulum (fig. 20).

Nasal bones long, tapered, produced to front of incisors or 1 to 2 mm beyond, tips rounded or bluntly pointed, not squared, flared or trumpet-shaped; premaxillary bones not reaching nasal tips; sphenopalatine vacuities absent; zygomatic arches weak, hardly spread beyond greatest width of braincase; zygomatic plate narrow, markedly reclined, hardly visible viewed from above; interorbital region smooth, wide; braincase smooth, subglobular, interparietal length 1 or 2 mm; incisive foramina long, narrow, terminating slightly behind anterior plane of M^1; palate produced to or slightly behind posterior plane of M^3.

Molars tetralophodont, hypsodont; molar rows parallel-sided or slightly convergent posteriorly; first molars with median fold, enamel of anterior margin of m_1 more or less crenulate; mesoloph(id) present to absent; upper cusps ovate to subtriangular, cuspids subprismatic, the opposing pairs in echelon.

The following description of the molars is based primarily on comparison of the type species of *Brucepattersonius* with that of the type species of *Oxymycterus* (*O. nasutus*). Less worn molars of other than the type species would reveal characters probably undetected in the worn teeth described here. For molar terminology see figs 31, 32.

Upper Molars

M^1. Procingulum with well defined anterior median fold, the anterolabial lophule (*b*) and anterolingual lophule (*c*) well defined; anteromedian style (*a*) absent; other elements absent in *B. soricinus* but present in *Oxymycterus nasutus* are anterolophule (*d*), anteroloph (*h*), paralophule (*m*), and enteroloph (*w*); mesoloph (*n*) present to absent in *Brucepattersonius*.

M^2. Procingulum vestigial, the major and minor enamel folds or flexi shallow but the four principal cusps well defined; mesoloph (*n*) absent.

M^3. Very simple with paraflexus (*3*) and entoflexus (*9*) reduced to enamel islands.

Lower Molars

m_1. Procingulum with shallow anterior median fold; the anterior enamel margin crenulate; labiolophulid (*d*) present, usually fused with protostylid (*g*); ectolophid present; mesolophid (*v*) present; lophids or lophulids absent in *B. soricinus* but present in *O. nasutus* are anterolophid (*h*), anterolophulid (*f*), mesolophulid (*s*), metalophulid (*u*), entolophulid (*x*); median fossette (*b'*) and posterior fossette (*c'*).

m_2. Short mesolophid (*v*) fused with metalophulid (*u*); ectolophid (*n*) and entolophid (*x*) absent; posterior fossette (c') present.

m_3. In this and m_2, the superflexid (*7*) defines what remains of the procingulum; lophids and lophulids absent, enamel folds indicated by indentations of the marginal enamel; m_3 about 2/3 bulk of m_2.

Comparisons. *Microxus* differs by much smaller size; claws longer, as in *Oxymycterus*; palate oryzomyine in length with posterolateral pits; mesoloph complicated or pseudopentalophodont with fused paralophule (*m*), metalophule (*p*) and mesostyle (*o*); mesolophid not certainly distinguishable.

Oxymycterus differs by bulbous rostrum; much longer, heavier claws, the manual as long or longer than the pedal; nasals more or less parallel-sided, tips square, often trumpet shaped; cusps (ids) more or less ovate, the inner and outer pairs more nearly opposite.

Abrothrix, once linked with *Oxymycterus*, is unrelated. Among the more obvious differences between it and *Brucepattersonius* are large or normal-sized eyeballs, simplified baculum, mesopterygoid vacuities present, zygomatic arches expanded, zygomatic plate stout, upright, anterior median folds absent in upper and lower first molars.

Relationship. *Brucepattersonius* is the akodontine apparently most nearly related to *Oxymycterus*, with which it had been confused. All distinctive characters of *Oxymycterus*, most notably larger overall size, long front claws, shorter hind claws, small ears and eyes, short tail, long snout, stomach morphology, diet, dental and cranial characters generally and geographic and ecological orientation, can be derived from an ancestral form near *Brucepattersonius*.

Distribution, associations. *Brucepattersonius* is the soricine sigmodontine supreme with its small size, long, slim body, short limbs, elongate tapered snout, small eyes, short ears and mainly if not entirely insectivorous diet. It is remarkable that the existence of this distinctive faunule, relatively uncommon but widespread over the well studied southern half of the Atlantic rain forest, should not have been appreciated until now. *Brucepattersonius* with its six currently recognized (including one unnamed) species proves to be one of the more speciose of the akodontine genera. The sylvan associates within its geographic range are *Blarinomys breviceps, Akodon serrensis, A. sanctipaulensis,* and *A. mystax* described here. *A. cursor* is essentially pastoral where trapped in Caparaó but the habitat was formerly sylvan. The monotypic *Thaptomys nigrita* is the burrowing sylvan form. The pastoral *Oxymycterus* is represented by the large *O. hispidus* or *O. rufus* and a smaller species described here as new. The sylvan oryzomyine-thomasomyine sigmodontines commonly occuring with *Brucepattersonius* are *Delomys* (*D. dorsalis, D. sublineatus*), *Oryzomys* (*O. ratticeps, O. capito, O. intermedius*), *Oligoryzomys* (*O. microtis, O. nigripes, O. fornesi,* and possibly one or two undescribed forms). A species each of *Rhipidomys, Rhagomys*(?), *Oecomys*, and *Nectomys* are the known remaining sylvan associates.

Key to species of *Brucepattersonius*

1a. Rostrum white; tail length more than combined head and body length ..... *albinasus*
1b. Rostrum dusky; tail longer or shorter than combined head and body length 2

2a. Tail less than 90 % as long as combined head and body length; underparts grayish with ochraceous wash ..... *soricinus*
2b. Tail 90 % as long or longer than combined head and body length 3

3a. Underparts dominantly grayish ..... *griserufescens*
3b. Underparts dominantly reddish or orange ..... *igniventris*

Note: The unidentified specimens from Tobunas, Puerto Gisela and Dos de Mayo with measurements given in table 8 represent an unknown species identified as *Oxymycterus iheringi* Thomas by Massoia (1963a), and Massoia and Fornes (1969). They have not been seen by me. They occur well outside the geographic range of those described here but may be congeneric.

Brucepattersonius soricinus, type and new species (fig. 21) — Soricine Brucie

Holotype. Adult male, skin and skull FM no. 94480, collected 26 July 1961, by A. M. Olalla, original number 1290.

Type locality. Ribeirão Fundo, São Paulo, Brazil.

Distribution. Known from type locality, and nearby localities Primeiro Morro and Morretinho, southwestern São Paulo, Brazil.

Diagnosis. Size smallest of genus except *B. albinasus* (new), described below, tail shortest relative to head and body length, general coloration brownish, underparts gray with ochraceous wash, skull and rostrum broadest.

Description of holotype. Pelage moderately adpressed, of dorsum about 8 mm long not concealing ears; crown to rump brown, cover hairs with tips minutely tipped blackish, followed by ochraceous orange band, remainder plumbeous; guard hairs entirely blackish; sides of trunk paler than back, the ochraceous bands wider, basal portions of hairs gray, the whole merging into grayish chest and belly with hairs broadly banded pale ochraceous, bases dark gray; throat, chin dominantly gray, the hairs directed forward; coloration of fore and hind limbs like that of trunk; longest claw of forefoot measured in straight line about 2 mm, of hind foot 4 mm; digital vibrissae sparse; facial vibrissae short, hardly reaching ear base when laid back.

Cranial. As described for the genus.

Dental. Anterior median fold or flexus present in first upper molar; mesoloph, protoloph, anteroloph and enteroloph absent; opposing cusps slightly oblique, form subprismatic.

Lower first molar with anterior flexid; mesolophid absent in first molar, sometimes present in second; labiolophulid present; anterolophid absent; ectolophid present; cusps more or less subprismatic.

Measurements. Table 9.

Type series. Essentially like holotype but average darker on dorsal suface, more reddish on chest, belly.

Comparisons. Smaller than other congenerics except *albinasus*, underparts less gray than in *B. griserufescens* (new) described beyond; more nearly like *igniventris* (new), see below, in size, proportions, coloration except throat, chin more gray, chest less orange; skull and rostrum broader.

Specimens examined: Total 6. São Paulo (Ribeirão Fundo, FM 1; Morretinho, FM 1; Primeiro Morro, FM 4).

Brucepattersonius igniventris, new species (fig. 22) — Red-Bellied Brucie

Holotype. Adult male, skin and skull. MZUSP no. 27000, collected 1 December 1989, by Philip Hershkovitz, Scott Lindbergh and Barbara E. Brown, original no. 9871.

Type locality. Iporanga (Petar) State Park, southwestern São Paulo, Brazil.

Distribution. Known only from type locality in the forested (now second growth) highlands of southwestern São Paulo.

Diagnosis. Reddish brown dorsally, reddish orange ventrally; tail shorter than head and body combined; longest manual/pedal claws on digits II, III; muzzle attenuated, nasal tips projected well beyond incisors.

Description of holotype. Most reddish brown species on upper parts, most intensely reddish orange on underparts, limbs, sides of head; a broad orange lateral line between reddish underparts and reddish brown upper parts.

Description of type series. Pelage of dorsum fine, soft, adpressed, the hairs 7—8 mm long; coloration of snout to rump reddish brown, sides slightly more reddish merging into dominantly reddish orange of cheeks, chin, throat, arms, belly, legs; the chest more uniformly reddish than other parts, the slaty bases of hairs showing through on belly; tail uniformly brownish, thinly clothed, the scales clearly visible, short thin pencil whitish to brownish; ears brown nearly hidden in fur; upper surface of fore and hind feet pale to dark brown; claws little recurved, short, weak; digital vibrissae of three middle toes whitish, vibrissae sparse or absent on outer toes; manual claws small, thin, seemingly ineffectual; facial vibrissae thin, the longest barely reaching ear base when laid back.

Cranial. Nasals slender, tips rounded; palate long, extending to posterior plane of m^3.

Dental. Worn in all 3 available specimens; anterior flexus (id) of m_1^1 evident.

Measurements. Table 9.

Comparisons. Coloration more reddish throughout, particularly of underparts, than in all other known forms; skull smaller than that of *griserufescens*, and the Argentine (Misiones) species; nasals longer more slender than in *B. soricinus*.

Specimens examined: Total 3. São Paulo (Petar, Iporanga, MZUSP 3).

Brucepattersonius griserufescens, new species (fig. 23) — Gray-Bellied Brucie

Holotype. Adult female, skin and skull, Museo Nacional, Rio de Janeiro, no. 32016, collected 7 October 1992, by Philip Hershkovitz, Scott M. Lindbergh, Alfredo Langguth and Barbara E. Brown, original number PH 10234.

Type locality. Terreirão, Parque Nacional de Caparaó, Minas Gerais, Brazil, elevation 2400 meters.

Distribution. Known only from the western slope of Mt. Caparaó, Minas Gerais; collected from 2100—2400 meters above sea level in remnants of Atlantic forest.

Diagnosis. Largest species of the genus; tail nearly as long to longer than head and body combined, underparts dominantly grayish.

Description of type series. Dorsum uniformly brownish from rostrum to tail base, pelage silky, hairs about 10 mm long, narrow subterminal band ochraceous orange, gray hair bases entirely concealed beneath long lax fur; sides of trunk and limbs like back; underparts grayish, variably washed pale ochraceous and more or less defined from sides; tail uniformly brown, the dorsal hairs about 1 scale long, ventral hairs, tip and pencil whitish, about 3 scales long, the scales showing through; ears brown, partly hidden in fur; hands and feet pale brown above, the palms pigmented or unpigmented, the soles brown; manual claws 2 mm long, pedal claws 4 mm; tail of holotype bobbed.

Remarks. Average tail length about equal to average combined head and body length, but 6 of 9 intact tails are longer, 2 slightly shorter, 1 same, as combined head and body length.

Measurements. Table 9.

Cranial. Muzzle long, slender, tapered, nasal tips rounded; zygomatic plate little exposed seen from above; interorbital edges rounded, braincase smooth; spread of zygomatic arches

Fig. 21: Soricine Brucie, *Brucepattersonius soricinus* (holotype FM 94480 ♂); skull and molars; GSL, 27.8 mm; upper molars, 4.2 mm; Ribeirão Fundo, São Paulo.

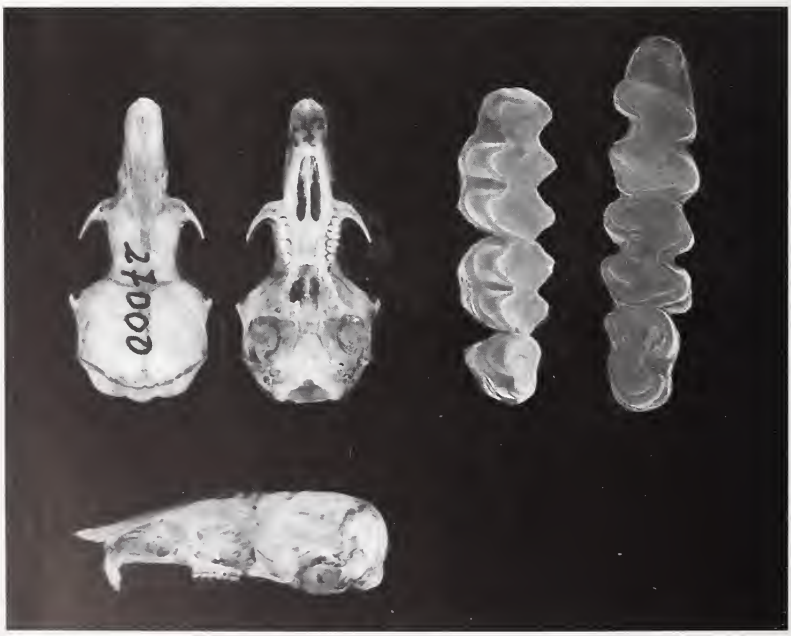


Fig. 22: Red-bellied Brucie, *Brucepattersonius igniventris* (holotype MZUSP 27000 ♂); skull and molars; GSL, 25.5 mm, molars, 4.5 mm; Petar, Iporanga, São Paulo.

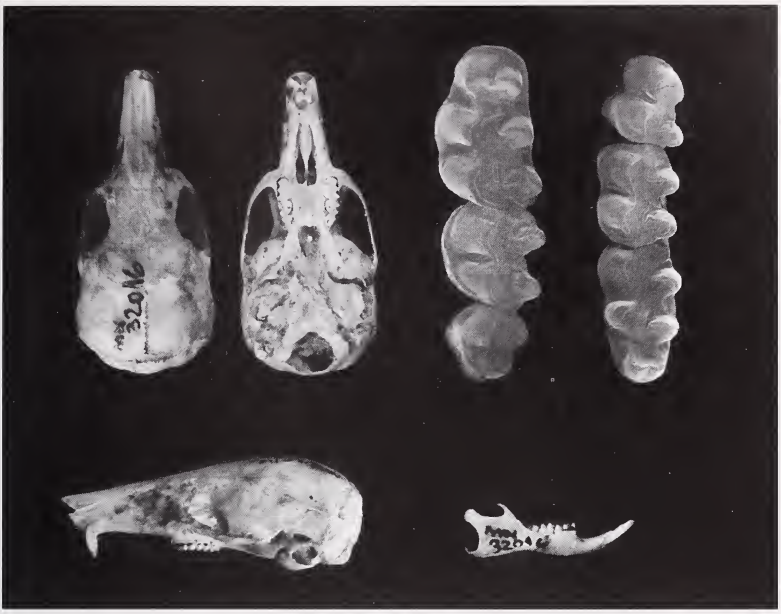


Fig. 23: Gray-bellied Brucie, *Brucepattersonius griserufescens* (holotype MN 32016); skull and molars; GSL, 26.4 mm; molars, 4.5 mm; Terreirão, Parque Nacional de Caparaó, Minas Gerais.

about same as greatest width of braincase; interparietal bone 1.5 x 8.0; incisive foramina extending to first enamel fold (supraflexus) of M^1; palatal bridge produced to posterior plane of M^3; width of mesopterygoid fossa about 2 mm; sphenopalatal vacuity absent; hamular processes of pterygoids destroyed; right auditory bulla, left side braincase damaged; capsular process of lower incisor root weakly pronounced.

Dental. Upper incisor thin, short, orthodont; lower incisor shorter than diastema; anterior median fold of M^1 deep; anterolophule fused with paracone; mesoloph fused with paracone and metacone in M^{1-2}; median fossette present in M^2; m_1 with anteromedian fold; mesolophid present; well developed labiolophulid (*d*) present; ectolophid of m_1 fused with paralophulid; hypoconulid and ectostylid fused in m_1; hypoconulid free in m_3.

Comparisons. Overall size largest of genus; tail, ears longer; underparts dominantly to entirely grayish contrasting with more reddish underparts of *B. igniventris* and *B. soricinus*; underparts as in the much smaller *albinasus* (described below); nasals longer, more slender, interorbital region widest of the genus.

Specimens examined: Total 15. Minas Gerais (Parque Nacional de Caparaó, Terreirão, 2400 m, MN 9; Segredo, 2100 m, MN 3; Cachoeira Bonita, 1450 m, MN 1; Pico da Bandeira, 2700 m, MN 1; locality unrecorded, MN 1).

Brucepattersonius albinasus, new species (figs 24, 25, 26) — White-Nosed Brucie

Holotype. Adult female, skin and skull, carcass in alcohol, Museo Nacional, Rio de Janeiro, no. 32017, collected 7 October 1992, by Philip Hershkovitz, Scott M. Lindbergh, Barbara E. Brown and Alfredo Langguth; original number PH 10246.

Etymology. The white triangular rostral patch of this species captures the attention. The white or colorless rostral field is a terminus of the pheomelanic pathway which begins with

Table 9: Measurements of the species and referred specimens of *Brucepattersonius*. First measurement of each taxon is of the holotype.

	iheringi[2] BM 89.9.16.8	*soricinus*[6] (FM 94480)	*igniventris*[8] (MZUSP 27000)	*griserufescens* (MU 32016)	*albinasus* (MN 32017)	Tobunas[9]	Pto. Gisela[9]	Misiones[11]
Head and body	100	110, 103(98–110)6	114, 115, 128	105, 103(93–109)12	88	111, 107	107, 107	103(93–111)7
Tail length	94	74[7], 83(82–85)3	99, —, 93	95[7], 103(97–112)10	100	87, 89	85, 83	86(83–90)7
Hind foot	23.5[3]	26, 25(24–26)6	25, 24, 25	26, 25(24–26)13	25	25, 24	22[3], 23[3]	22(21–24)7[2]
Ear	16	15, 16(15–17)6	16, 16, 18	17, 17.5(16–19)12	17	16, 18	18, 18	18(16–19)7
Weight	—	—	31, 30, 35	23, 23.7(20–27)12	20	—, —	—, —	43(40–45)3
Greatest skull length	27.4[4]	27.8, 27.3(26.5–27.8)4	27.9, —, 28.0	29.2, 29.4(28.8–30.5)11	ca 27.8	29.1, —	29.0, 28.1	29.0(28.1–29.5)6
Condylobasal length	24.7[4]	24.7, 24.7(24.5–24.9)3	25.5, —, 25.2	26.4, 26.1(25.5–27.6)11	ca 24.3	25.5, —	25.3, 24.1	—
Zygomatic breadth	13	12.4, 12.4, 13.1	13.4, —, 13.5	12.7, 12.9(12.4–13.2)10	12.2	13.4, —	12.8, 12.1	13.3(12.8–13.6)7
Interorbital width	6	6.0, 6.0(5.8–6.2)4	6.3, —, 6.0	6.1, 6.2(5.9–6.6)12	6.2	5.8, —	5.8, 5.8	6.0(5.8–6.4)7
Braincase	12.5	12.8, 12.1(11.0–12.8)5	—, 12.7, —	12.9, 12.7(12.4–13.3)11	11.7	12.6, 13.0	12.6, 12.8	—
Nasal length	11	10.8, 10.9(10.1–11.9)4	11.7, —, 12.2	11.8, 11.5(10.1–11.9)12	10.5	12.0, —	11.7, 11.7	—
Incisive foramen	5.2	6.0, 6.0(5.9–6.1)6	6.5, —, 6.3	6.5, 6.4(6.0–6.6)12	6.0	5.5, —	5.6, 5.7	—
Palate, length	—	4.2, 4.1(3.7–4.3)5	4.1, —, 4.2	4.9, 4.4(4.1–4.9)12	4.3	4.7, —	4.8, 4.3	4.6(4.3–4.8)7
Zygomatic plate	—	1.5, 1.7(1.5–2.0)6	1.6, —, 2.0	1.6, 1.6(1.5–1.9)12	1.6	1.5, 1.5	1.8, 1.5	—
Molar row	4.2	4.3, 4.3(4.2–4.4)6	4.5, 4.7, 4.5	4.5, 4.6(4.4–4.9)12	4.4	4.8, 4.4	4.8, 4.6	4.7(4.4–4.9)7
Diasteme	6.8[5]	7.0, 6.6(6.2–7.0)5	7.2, —, 7.0	7.3, 7.5(7.1–8.4)11	6.8	7.1, —	7.0, 6.6	—
Rostrum, width	—	4.9, 4.7(4.6–4.9)6	4.8, —, 4.8	4.6, 4.4(4.0–4.8)12	3.8	4.8, 5.2	4.8, 4.8	—
Naso-int-oct[1]	—	25.0[1]	26.3[1], —, —	26.6[1], —	24.8	—	—	—
Mandible, length	16.8	16.6, 16.4(15.8–16.8)6	17.7, —, 17.0	16.8, 17.8(16.8–19.9)11	16.2	13.3, 13.9[10]	14.0, 14.3[10]	15.9(14.5–16.6)3

[1] Tip of nasals to interparieto-occipital suture of holotypes only.
[2] Taquara, Rio Grande do Sul; original measurements of holotype from Thomas (1896: 308).
[3] without claw
[4] From Philip Myers (personal communication). Original cranial length measurements of holotype by Thomas (1896: 308) are basal, 23; basilar 21.4.
[5] From Philip Myers (personal communication).
[6] São Paulo: Primeiro Morro, 4; Riberão Fundo, 1; Morretinho, 1.
[7] Bobbed tail
[8] Individual measurements in same order throughout: first measurement is of holotype MZUSP 27000.
[9] Misiones, Argentina, from Massoia (1963: 134).
[10] Misiones, Argentina, from Massoia (1963: 134).
[11] From Massoia and Fornes (1969: 320) Tobunas, 2; Dos de Mayo, 3; Puerto Gisela, 2.

Fig. 24: Mustached Brucie, *Akodon mystax* (top), and White-nosed Brucie, *Brucepattersonius albinasus* (bottom).

reddish (e. g., *Wiedomys pyrrhorhinus*), bleaches to yellowish in others (e. g., *Akodon xanthorhinus*), and finally white. The rostral patch may also be blackish (eumelanic) as in *Akodon mystax* described above, and the species of *Oxymycterus* discussed elsewhere (Hershkovitz, 1994).

Type locality. Pico da Bandeira, Parque Nacional de Caparaó, Minas Gerais, Brazil, elevation, 2700 meters.

Distribution. Known only from the type locality in the Parque Nacional de Caparaó. *B. albinasus* and *B. griserufescens* occur together on the Pico da Bandeira at 2700 meters.

Diagnosis. Smallest species of the genus; tail longest, about 114 %, relative to head and body length; general coloration brownish, rostral patch, upper surface of hands, and caudal pencil whitish.

Comparisons. Distinguished from all other species by smaller size, tail longer than head and body combined, and white triangular rostral patch.

Description. Size, smallest of genus; pelage long, fluffy, hairs of middorsum 10—12 mm long; dorsum from head to rump dark brown, sides similar, well defined underparts grayish with thin ochraceous wash, the slaty hair bases showing through; inner surface of limbs like ventrum; hairs of triangular rostral patch, upper surface of hands (fig. 25) and tail pencil whitish, feet grayish, the pale brownish skin showing through; digital and facial vibrissae whitish, the rostral vibrissae laid back reaching ear bases; tail extremely long, about 114 percent of head and body length, brown above, ventral hairs whitish about 5—7 scales long, the scales not hidden; volar pads six; foreclaws thin, weak, length about 2.5 mm, hind claws sturdy, about 3.5 mm.

Cranial. Skull smooth, without crests or ridges; rostrum slender, elongate, length about 40 % percent of skull length; nasal tips rounded, produced slightly less than 1.0 mm beyond incisors, without expansion or formation of trumpet; zygomatic arches weak, hardly expanded beyond sides of braincase; zygomatic plate narrow, sloping back from base, hardly visible viewed from above; interorbital region comparatively wide; braincase subglobular; interparietal about 1.0 x 4.7 mm; incisive foramina long, narrow, terminating slightly posteriad to procingulum of m^1; palate produced slightly behind posterior plane of m^3; greatest width of mesopterygoid fossa 1.7 mm; sphenopalatine vacuities absent; damaged and detached posteroventral portions of braincase including sphenoidal, occipital, mastoidal, and petrous portions too fragmented for accurate description. Mandible slender, smooth, without defined incisor root capsule.

Dental. Molar rows very nearly parallel-sided discounting greater width of first over third molars, opposing cusps oblique.

M^1: Anteromedian fold present; anteromedian style absent; anterolabial conule larger than anterolingual; minute protostyle (*i*) present; minute paralophule (*m*) fused with *i*; absent elements compared with *Oxymycterus nasutus*, include enteroloph (*u*), enterostyle (*x*), plesiostyle (*f*), anteroloph (*h*), mesoloph (*n*), and mesostyle (*o*); short paraflexus (*3*) and metaflexus (*5*) isolated on occlusal surface; median fossette (*a'*) present; posterior fossette (*b'*) indicated by a dot.

M^2: Like M^1 except procingulum reduced, accessories absent; paraflexus (*3*) and protoflexus (*8*) present; median fossette (*a'*) coalesced with paraflexus (*3*); mesoloph (*n*) absent; mesoflexus (*4*) absent or combined with metaflexus (*5*); posterior fossette (*b'*) coalesced with metaflexus (*5*); presence of posteroloph (*t*) indicated by posteroflexus (*6*).

M^3: Worn; subtriangular in outline, less than half size M^2; paracone (*1*), protocone (*v*), hypocone (*y*) raised, metacone (*q*) indicated; paraflexus (*3*) isolated; entoflexus (*9*) well defined.

m_1: Anteromedian stylid (*a*) absent, preflexid (anteromedian fold) (*1*) absent not to be confused with crenulation of anterior enamel margin; supraflexid (*7*) present; labiolophulid (*d*) fused with protoconulid (*j*); protoflexid (*8*) poorly defined; included present are hypoflexid (*10*), paralophulid (*1*), ectostylid (*n*), metaconid (*t*), entoconid (*y*), posterolophid (*r*),

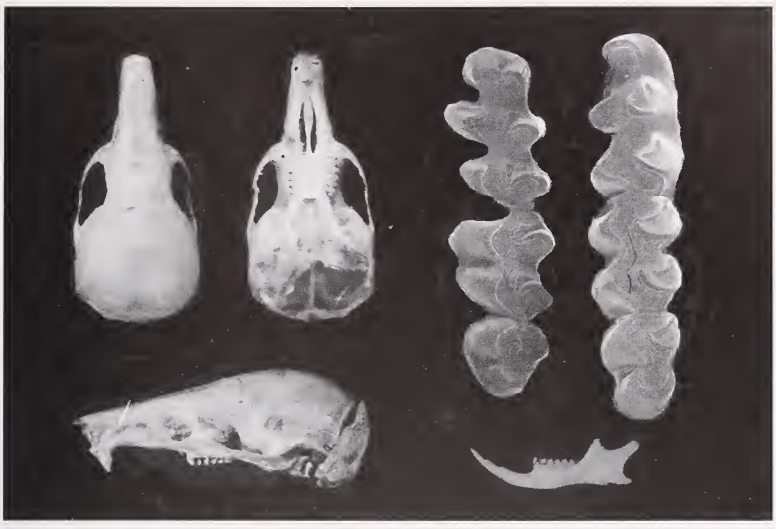


Fig. 25: White-nosed Brucie, *Brucepattersonius albinasus* (holotype MN 32017); skull and molars; GSL, 27.8 mm; molars, 4.4 mm; Pico da Bandeira, Parque Nacional de Caparaó, Minas Gerais.

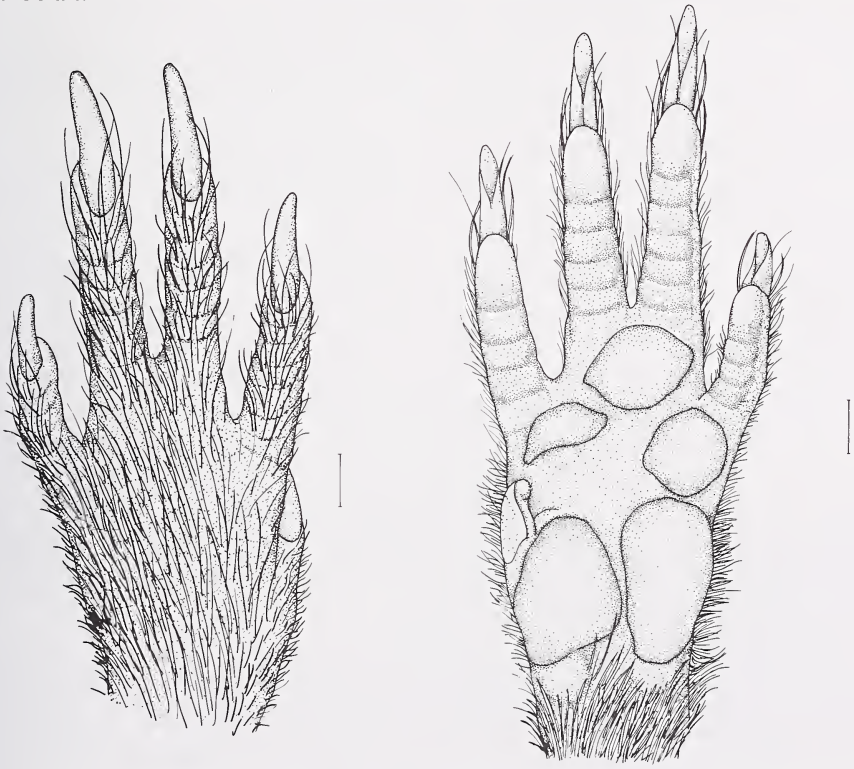


Fig. 26: Left hand of White-nosed Brucie, *Brucepattersonius albinasus* (holotype MN 32017 ♀); A, dorsal aspect; B, ventral aspect.

mesolophid fused with metalophulid and or metaconid; coronal surface with only short isolated mesoflexid (*4*) and posteroflexid (*6*).

m_2: Like m_1 but with reduced procingulid, distoflexid (*11*) less worn, better defined.

m_3: Narrower, shorter than m_2; main cusps well defined; mesoflexus (*4*) isolated, nearly as long as that of m_2 but size may be increased by fusion with adjacent elements.

Measurements. Table 9.

Specimens examined: Total 1. Minas Gerais (Parque Nacional de Caparaó, Pico da Bandeira, 2700 m, MN 1 [holotype]).

Brucepattersonius iheringi Thomas — Ihering's Brucie

Hesperomys nasutus, Hensel (not Waterhouse), 1873: 43, figs 19a, b, 29a, b (molars) — BRAZIL: Rio Grande do Sul.

H[esperomys]. nasutus, Leche (not Waterhouse), 1886: 700, figs 29—30 (molars) — BRAZIL: Rio Grande do Sul (Taquara do Mundo Novo); cranial and dental characters.

Hesperomys (*Oxymycterus*) *nasutus* (not Waterhouse), Ihering, 1892, Anuario do Estado do Rio Grande do Sul, para 1893. 9: 109 — BRAZIL: Rio Grande do Sul (Taquara do Mundo Novo).

Oxymycterus iheringi Thomas, 1896: 308; description. Thomas 1902: 62 — BRAZIL: Paraná (Roça Nova, Serra do Mar, 1000 m); coloration.

Oxymycterus iheringi, Massoia 1963a: 129 (part) — comparisons; taxonomic history of holotype. Massoia & Fornes 1969: 315 (part) — taxonomic history of holotype. Musser & Carleton 1993: 727 — taxonomic comments.

M[icroxus]. iheringi, Thomas 1909: 237 — reclassification.

Microxus (?) *iheringi*, Gyldenstolpe 1932: 134 — characters; taxonomy.

[?] *Microxus iheringii* [sic] Vieira 1953: 145 — BRAZIL: Rio Grande do Sul (São Lourenço); São Paulo (Campos do Jordão); characters [measurements of male not of *O. iheringi* — PH]. Massoia 1963: 135 — Vieira identifications questioned.

Akodon (*Microxus*) *iheringi*, Cabrera 1961: 458 — classification; distribution.

Holotype. Female, skin and skull, British Museum (Natural History) no. 86.9.16.8; collected by Hermann von Ihering.

Type locality (fig. 1). Rio dos Linos (sic = Sinos), Taquara do Mundo Novo, Rio Grande do Sul, Brazil, 29°39'S, 50°47'W; 29 m.

Distribution. Forested parts of southeastern Brazil in the states of Rio Grande do Sul, Paraná and perhaps São Paulo.

Diagnosis (from literature). Size small, upper parts and sides grayish, underparts undefined from sides; tail nearly as long as head and body combined.

Characters. *Oxymycterus iheringi* Thomas is virtually unknown apart from the original description and some bibliographic references. The specimens from Misiones, Argentina, described by Massoia (1963), and by Massoia and Fornes (1969), as surrogates for true *iheringi*, do not agree with that species in coloration, size and perhaps other characters. Measurements are reproduced here (table 9), details of color are quoted, and mentioned in the discussion of the Misiones material. The original Thomas description of *iheringi* and his other contributions are reproduced as follows.

"*Oxymycterus Iheringi*, sp. n." [Thomas, 1896: 308]

"Much smaller, more slenderly built, and less Oxymycterine than *O. nasutus, rufus,* and the other more typical species. Fur soft and thick. General colour uniform grizzled brown, scarcely paler below. Eyes not unusually small. Ears fairly large, thinly haired, brown. Claws much less lengthened than in *O. nasutus*, but still with the essential fossorial structure characteristic of the group; pollical claw short. Fifth hind toe decidedly longer than the hallux, reaching to the level of the base of the fourth toe. Tail almost as long as the head and body, slender, thinly haired, brown above, rather paler below. Mammae 1—2 = 6.

"Skull not specially elongated anteriorly, although the muzzle shows something of the characteristic *Oxymycterus* structure. Supraorbital edges smoothly rounded. Interparietal and anterior zygoma-root and other details very much as in *O. nasutus*, in spite of the great difference between the two in the general proportions of the skull.

"Dimensions of the type (an adult female in spirit)," [are reproduced in table 9].

"The two specimens of this species in the Museum are part of the large collection of Taquara rodents worked out by Dr. Leche [footnote, 'Zool. Jahrb. i. p. 700 (1886)'.], by whom the present animals were called *Oxymycterus nasutus*, under which name they have remained in the Museum collection until now. Among other rodents collected by Dr. von Ihering at San Lorenzo, in the same province, there are specimens undoubtedly referable to the true *O. nasutus*; but these two from Taquara, and no doubt the others seen by Dr. Leche, are so different that there can be no question as to their specific distinction [footnote, 'Dr. Leche says that of nineteen skulls examined by him the largest had a basilar length of 22 millim. The basilar length of the true *O. nasutus* is from 27 to 29 millim.']. Dr. Leche was no doubt led astray by Hensel, in whose classical paper on the mammals of Rio Grande do Sul [footnote, 'Abh. Ak. Berl. 1872: 43'] the species now described is also referred to *O. nasutus*. Hensel's account must therefore in future be assigned to *O. Iheringi*, to our knowledge of whose structure and habits he makes some valuable contributions. The difference between the two forms is so great that it is difficult at first sight to realize that *O. Iheringi* is an *Oxymycterus* at all, as it is quite without the extraordinary trumpet-shaped muzzle possessed by *O. nasutus* and its allies. Probably it is most nearly related to Winge's *O. talpinus* [footnote, 'E Museo Lundii, iii. p. 36 (1887).'], as yet only known fossil from Lagoa Santa, but has rather a shorter head and shorter palatine foramina; so that I have not been able to assign it to the fossil form, as in the case of the animal next to be described."

In a report of a male from Serra do Mar, Paraná, Thomas (1902: 62) noted that "this is the first skin . . . of *O. Iheringi* which I have seen, the original series all having been in spirit. The general colour should rather have been described as grey than brown."

In 1909 (p. 237) Thomas referred *iheringi* to his newly erected genus *Microxus*.

The specimens of *O. iheringi* collected by Hensel (1872: 43) in Rio Grande do Sul and recorded as *Hesperomys nasutus* include 2 skeletons, 2 skulls and 1 or 2 entire in spirits. His measurements of basilar length of the smaller of the two skulls was 20.0 mm, upper molar row 4.1 ($M^1 = 2.0$, $M^2 = 1.30$, $M^3 = .90$). Measurements of the larger skull were basilar length 22.2; nasals 12.5; incisive foramen 5.3; interorbital width, 6.1; interparietal, 1.4 x 7.7; mandibular depth below m_1 2.7, below m_2 2.3. Vertebral count of the skeleton was 12 thoracic, 7 lumbar, 20 caudal.

Measurements of a male identified by Vieira (1953: 145) as "*Microxus iheringi*," provenance unspecified, appear to be those of *Oxymycterus nasutus*. In all likelihood other specimens Vieira recorded at the same time under the same name, one from São Lourenço (no. 572), and two females from Campos do Jordão (nos. 2073-74), are likewise referrable *to O. nasutus*. Notwithstanding, they are listed in the above synonymy of *O. i. iheringi* as possible sympatriots in hypothetical northern and southern extensions of its geographic range.

Specimens examined: None.

Brucepattersonius sp. (Misiones, Argentina)

Oxymycterus iheringi, Massoia (not Thomas) 1963: 129, figs 1—4 (skull) — ARGENTINA: Misiones (Tobunas, Ruta 14, km 352; Puerto Gisella, Río Paraná); characters; comparisons; taxonomy; habitat. Massoia & Fornes 1969: 315, fig. 1 (animal), fig. 2 (palate), fig. 3 (molars); ARGENTINA: Misiones (Tobunas; Dos de Mayo; Puerto Gisella); taxonomic history; characters; comparisons.

The Misiones, Argentina, sigmodontines identified with typical Rio Grande do Sul *Oxymycterus iheringi* Thomas, are apparently congeneric judged by the descriptions and illustrations published by Massoia (1963), and Massoia & Fornes (1969), but not likely conspecific. Massoia's (1963: 133) description of the four Misiones specimens he recorded follows, freely translated from Spanish.

"This is a small species of *Oxymycterus* with comparatively short claws, the length in a straight line between 2.3—2.6 mm; pelage soft, general coloration of dorsal surface approxi-

Table 10: Original measurements of *Oxymycterus rufus* compared with hocicudos from selected localities. All measurements by the author except as noted.

	Head & Body	Tail	Hind foot	Condylobasal	Molar Row
32° South[1]	135[1]	135 [95]	35.2[1]	—	—
Delta Parana[2]	153(134—189)4	95(94—96)4	30(29—31)4[8] 25(22—27)4[8]	32.3(30.6—34.6)3	5.2(5.2—5.3)4
Delta Parana[3]	153(139—180)6	93(86—97)6	25.8(23—27)6	—	5.3(5.2—5.6)6
Caparaó[4]	152(139—165)7	129(114—151)3	35(32—37)7	34.4(32.6—36.5)7	5.7(5.5—5.8)7
Primeiro Morro[5]	161(154—173)8	122(117—129)8	35(35—36)8	—(35.2)1	5.6(5.5—5.9)8
Caraguatay[6]	167(164—179)5	131(123—135)5	37(34—38)5	37.4(36.9—38.2)3	5.5(5.2—5.6)5
Iporanga[7]	174(150—186)5	136(111—148)3	36(32—38)7	36.6(34.8—38.0)7	5.9(5.7—6.1)7

[1] Entre Rios, Argentina, type locality of *Oxymycterus rufus*; data from Azara 1802; Old French measurements converted to metric system: Total length 8 1/2", less tail 3 1/2" = 132 mm; second specimen, total length 9 1/2" = 250 mm, tail length not given; hind foot to tip of longest claw, 13"' = 35.2

[2] Buenos Aires, Argentina; Pereira, 1 (FM); Punta Lara, 3 (FM).

[3] Buenos Aires, Argentina; Measurements from Massoia (1961).

[4] Minas Gerais, Brazil (FM); tentatively *O. rufus*.

[5] São Paulo, Brazil (FM).

[6] Misiones, Argentina (FM).

[7] São Paulo, Brazil (FM); tentatively *O. hispidus*.

[8] In dry skin; with claw and without claw.

mately dark ochraceous "pardusca ochracea" "(YYO-6-3°)," gradually passing into a grayish brown ("amarillo pardusco pálido") "(YYO-17-5°)" on belly, all hair bases being plumbeus gray "(C-6-1°)."

Massoia & Fornes (1969: 319) described the dorsal surface of 7 Misiones specimens (including the foregoing) as a mixture of grayish chestnuts and yellows ("castaños, grisaceos y amarillos") "(0-5-7)." The color terms used are from the "Atlas de Villolobos Domingues y Villalobos." The "Atlas" is not available but the color terms are standard.

Cranial characters were said by Massoia (1963: 173) to be similar to those of adult *Oxymycterus nasutus* except smaller. The nasals of four specimens (Pto. Gisela, 2; Tobunas, 2) were described as completely fused except for about 1/3 their length, a character not seen before in sigmodontines.

The crown surfaces of upper and lower molars of the Tobunas mice were figured by Massoia & Fornes (1969: 318) in comparison with those of *Oxymycterus nasutus*. The peculiar nasal character was not mentioned.

The two Tobunas mice recorded by Massoia were trapped at night in wooded areas, one on the border of a rocky stream, the other in a low brushy area on the edge of a pathway.

Measurements. Table 9.

Specimens examined: None.

Oxymycterus Waterhouse

Type species *Mus nasutus* Waterhouse, 1837: 16, by original designation.

Oxymycterus rufus Fischer (fig. 27)

Mus rufus Fischer, 1814: 71.

Holotype. Not known to exist; name based solely on the description of the rat cinquième ou rat roux of Azara (1801(2): 94).

Type locality. 32°30'S, Rio Paraná = Entre Ríos, Argentina (cf. Hershkovitz 1994: 35).

The large reddish hocicudo ("long nosed" in Spanish) of Paraguay, Uruguay, the Argentine provinces of Entre Rios and Buenos Aires, and the Brazilian states of Rio Grande do Sul and Santa Catarina, have generally been identified as *Oxymycterus rufus* Fisher. Other named large hocicudos of the same regions are *O. misionalis* Sanborn (1931) from Misiones, Argentina, *O. judex* Thomas (1909) from Santa Catarina, and *O. quaestor* Thomas (1903) from Paraná. All three have since been treated as subspecies of the Bahian *O. hispidus* (fig. 28) by Cabrera (1961: 467), and as outright synonyms of *O. hispidus* by Musser & Carleton (1993: 727). *Oxymycterus hispidus* from Bahia, described by Pictet in 1843, is known from the original description only. The holotype, if extant, awaits comparison with any of its referred conspecifics, or with a topotype or near topotype of *O. rufus*, which lacks a type specimen.

Coloration of the hocicudo as described by Azara in the Spanish edition (1802: 80) as canela or cinnamon, a hue which could apply to any reddish hocicudo and to most specimens of the localities listed in table 9.

Measurements given by Azara in the original description of *O. rufus* and reproduced in table 9, agree best with those of the mouse from the Delta Paraná, Argentina (table 10) except that hind foot length is much too large. However, total length of the larger of the two hocicudos measured by Azara brings other extrapolated dimensions into line with those of the larger individuals listed in the same table. The name *Oxymycterus rufus* Fisher, therefore, is the earliest available for the species. The Delta Paraná hocicudos with short hind feet may not be *Oxymycterus rufus*. The large hocicudos from Caparaó, Primeiro Moro, Iporanga, and Caraguatay may not be conspecific but cannot be shown to be either *O. rufus* (fig. 27) or *O. hispidus* (fig. 28). They are much larger than the next described hocicudo.

Measurements. Table 10.

Specimens examined. Total 17. São Paulo (Petar, Iporanga, 8 MZUSP); Espírito Santo (Parque Nacional de Caparaó, Pedra Roxa, 6 MN); Minas Gerais (Parque Nacional de Caparaó, Cachoeira Bonita, 1 MN; Vale Verde, 1 MN); locality unrecorded, 1 MN.

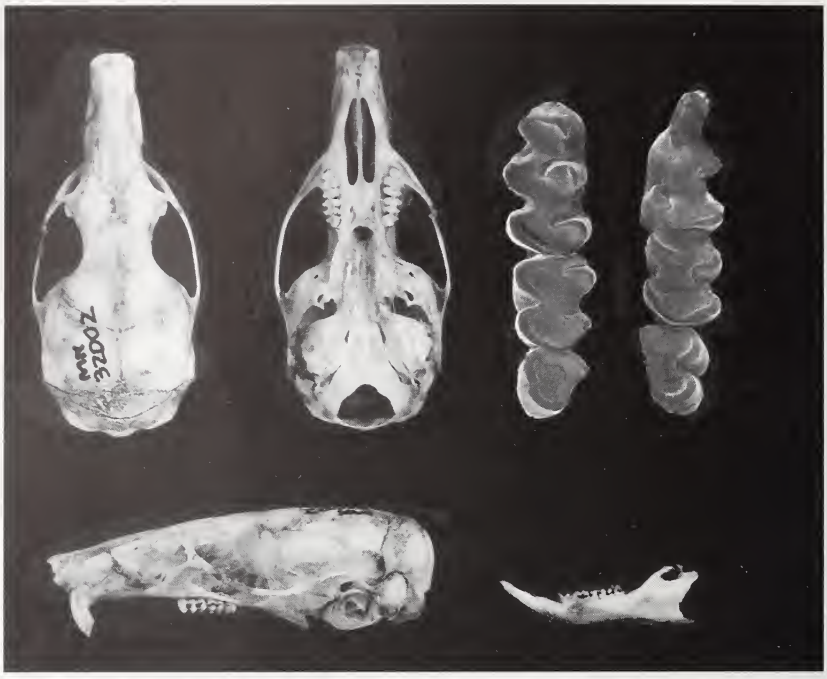


Fig. 27: Azara's Rufus Hocicudo *Oxymycterus rufus* (MN 32002 ♂); skull and molars; GSL, 35.8 mm; molars, 5.5 mm; Pedra Roxa, Pico da Bandeira, Parque Nacional de Caparaó, Espírito Santo.

Oxymycterus caparaoe, new species (fig. 29, 30)

Holotype. Adult female, skin and skull, MN no. 31997, collected 25 October, 1992, by Philip Hershkovitz, Scott M. Lindbergh, Alfredo Langguth and Barbara E. Brown, original no. 10426.

Type locality. Arrozal, Parque Nacional de Caparaó, Minas Gerais, Brazil, elevation 2400 m.

Distribution. Known only from the western slope of the Pico da Bandeira, Parque Nacional de Caparaó, Minas Gerais.

Diagnosis. A small, dark brown hocicudo with orange underparts, and long, slender, trumpet-shaped nasals.

Characters. External. Upper surface of body dominantly dark brown modified agouti, pelage thick, long, lax, about 1 cm long on dorsum; individual hairs with tip blackish, the single orange subterminal band minute; basal portion of hairs slate color; sides of body more orange, the subterminal pheomelanin band wider; underparts orange but with slaty basal portion of hairs showing through, the broad ventral midline stripe from throat to anus nearly entirely orange; ears moderately large, pinna dark brown; cheiridia long, narrow blackish above and below each with 6 plantar pads; manual claws longer than pedal claws; manual digit III with claw 7.9 mm, digit IV with claw 5.8 mm, adjacent digits shorter, digit I vestigial, claw, 2.5; digit V, not reaching base of IV, with claw 2.3, reaching phalanx 1; pedal digit I extending to base of II, with claw to base of phalanx 2 of II, digit V about same; claw I, 3.2 mm;

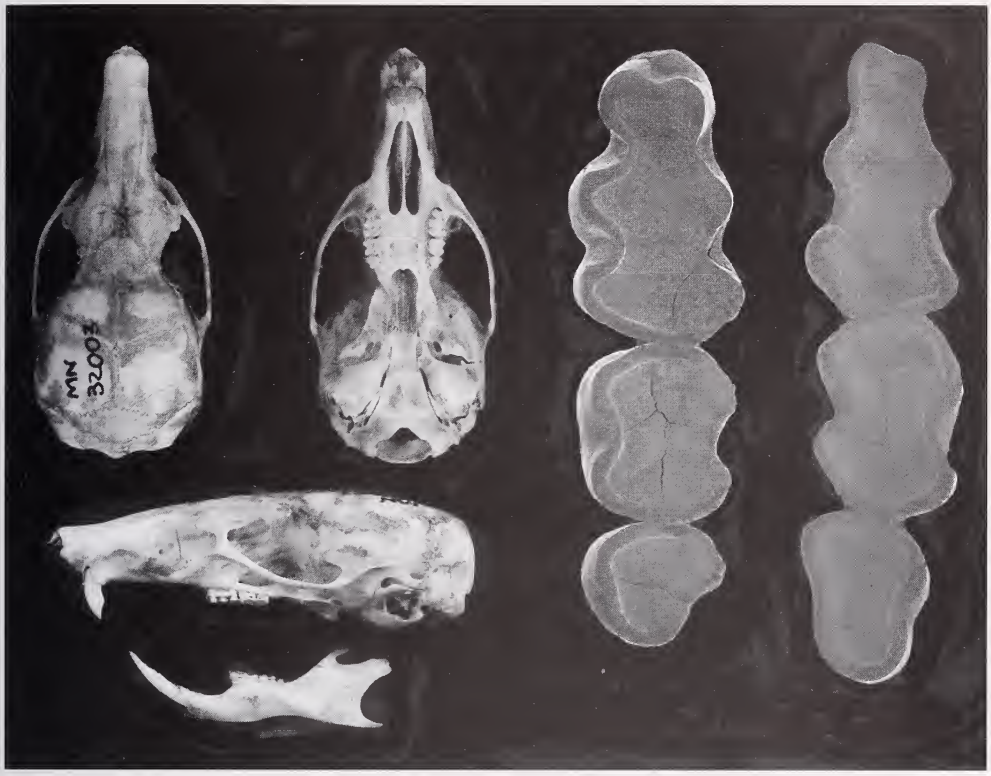


Fig. 28: Hispid Hocicudo, *Oxymycterus hispidus* (MN 32003).

II, 3.8; III, 4.0; IV, 3.8; V, 3.6; interdigital webbing present between second phalanges of digits II, III, IV; tail uniformly dark brown, scutular hairs short, those of underside longer but not concealing scales. Mammae 1-2 = 6.

Cranial. Dorsal contour of skull gently sloping; rostrum elongate, nasals with premaxillary bones parallel-sided, their combined tips slightly trumpet-shaped; zygomatic arches slender, zygomatic plate visible when viewed from above; frontal sinuses little inflated; temporal ridges weak; well defined interparietal bone small (3 x 9.2 mm); incisive foramina (1.7 x 6.9) extending slightly behind level of metacone of M^1; posterior palatal border level with posterior border of last molars; mesopterygoid fossa wide (1.8 mm).

Dental. Incisors orthodont, combined cutting edges plane; molars tetralophodont, hypsodont, the cusps opposed, worn crowns deeply dished, 8-shaped; M^1 with anterior median flexus, M^3 small, the attenuated metacone and hypocone barely distinguishable from each other; lower molar crowns as worn as uppers, opposing cusps oblique; anterior median flexus present; mesolophid, ectolophid and protocunulid defined in m_{1-2}; m_3 nearly twice as large as M^3.

Measurements. Table 11.

Comparisons. *Oxymycterus caparaoe* can be distinguished by smaller size alone from larger sympatric *Oxymycterus rufus* or *O. hispidus*. It is separated from the similar sized southeastern Brazilian *O. nasutus* Waterhouse (1837) (fig. 30) by paler coloration (table 12) and more projecting rostrum. Comparative morphometrics are in table 11.

Table 11: *Oxymycterus caparaoe* and *Oxymycterus nasutus* compared: measurements are means, extremes, sample number.

	Holotype	*caparaoe*[1]	*nasutus*[2]	*nasutus*[3]
Head and body	125	126(110–139)28	125(110–137)5	129(114–141)9
Tail	91	93(80–104)22	86(79–90)5	85(72–91)9
Hind foot	27	27(24–29)27	27.6(27–28)5	23[4](22–24)9
Ear	18	19(17–21)27	—	17(16–19)9
Gr. skull length	34.3	34.4(32.9–35.9)15	32.2(30.3–33.4)3	32.8(31.5–34.5)3
Condylobasal length	30.7	30.3(28.6–31.7)16	29.9(28.8–31.1)5	—
Zygomatic breadth	13.8	13.9(13.6–14.4)9	14.1, 14.2	14.0(12.7–15.0)3
Interorbital width	5.7	5.9(5.5–6.4)22	5.5(5.3–5.7)5	5.8(5.5–6.1)3
Braincase width	13.7	13.8(12.9–14.5)16	13.0, 13.6	—
Nasal length	12.0	12.9(11.4–14.5)16	13.0(13.3–14.2)3	12.1(11.5–12.7)3
Incisive foramina	7.0	6.8(6.5–7.2)19	7.1(6.9–7.3)3	—
Rostrum width	4.3	4.5(4.0–5.0)21	—	—
Zygomatic plate	2.3	2.1(1.6–2.4)18	2.1(2.0–2.1)3	—
Diastema	7.9	7.9(7.3–8.8)18	7.5(7.3–7.5)3	—
Molar row	4.8	4.7(4.5–5.5)19	4.8(4.7–4.8)3	4.7(4.6–4.9)3

[1] HB = Head and body; [2] with claw; [3] from notch; [4] CL = Condylobasal length; [5] ZB = Zygomatic breadth; [6] IB = Interorbital breadth; [7] BW = Braincase width; [8] NL = Nasal length; [9] IF = Incisive foramen; [10] PL = Palatal length; [11] UM = Upper molar row; [12] D = Diastema; [13] R = Rostral breadth; [14] W = Weight, grms; [15] ZP = Zygomatic plate.

Table 12: Phenotypes compared of *Oxymycterus caparaoe* (type series) and *O. nasutus* topotypes.

Character	*caparaoe*	*nasutus*
1. Dorsum	Dominantly dark brown (eumelanic) modified agouti	Dominantly ochraceous (pheomelanic) modified agouti
2. Underparts	Saturate orange (pheomelanic) with basal gray showing through	Dilute orange (pheomelanic) with basal gray showing through
3. Sides of trunk and head	Dark brown like back or slightly paler	Nearly or entirely uniformly orange
4. Crown	Darker than back	Orange like back
5. Tail	Uniformly blackish	Bicolor; pale brown above; distinctly paler beneath
6. Hind feet	Blackish above and below	Pale above, nearly colorless beneath
7. Ears	Dark brown	Ochraceous

Dimensions of Andean Division size groups of hocicudos are roughly comparable to those of the Atlantic Division (cf. Hershkovitz 1994). The small Andean *O. hiska* and *O. hucucha* are smaller than any Atlantic Division hocicudo, the large *O. inca* parallels members of the

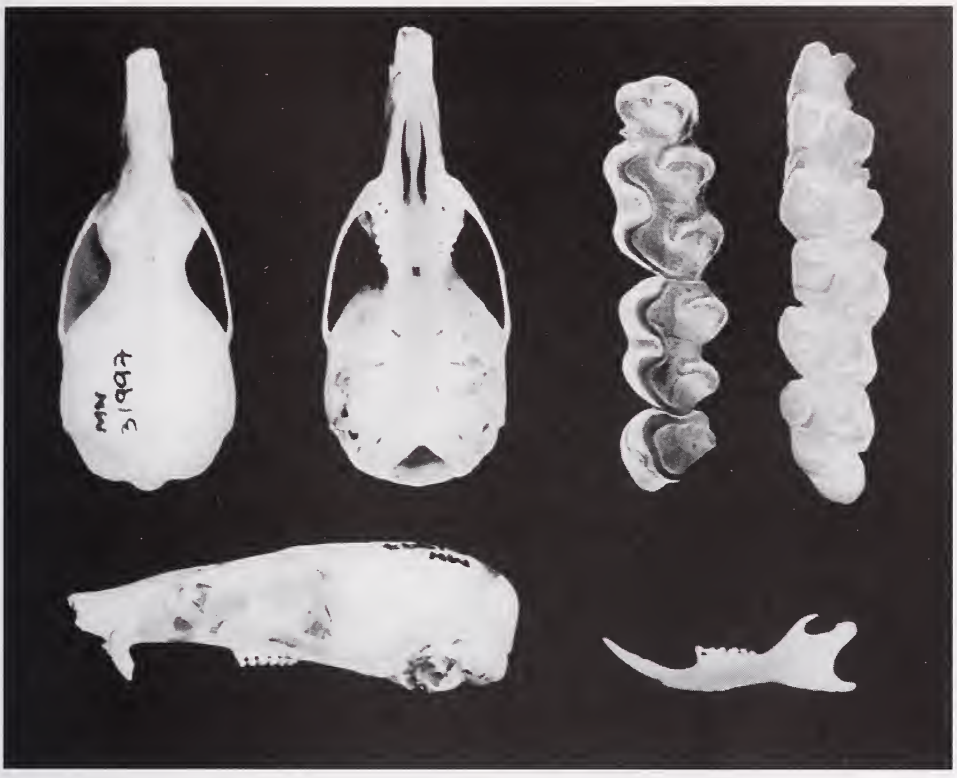


Fig. 29: Mt. Caparaó Hocicudo *Oxymycterus caparaoe* (holotype MN 31997 ♀); skull and molars; GSL, 34.3 mm; molars, 4.5 mm; Arrozal, Pico da Bandeira, Parque Nacional de Caparaó, Minas Gerais.

O. rufus-hispidus group, and those of the medium-size *O. paramensis* group equate with the medium and intermediate-size *O. nasutus-O. caparaoe* group. Morphometrics of *O. paramensis, O. nasutus,* and *O. caparaoe* are virtually the same but *O. caparaoe* is intermediate in coloration, *O. paramensis* being the paler.

Most cranial differences between *O. caparaoe* and *O. paramensis* vary randomly from population to population. The consistently different traits of *O. paramensis* include shorter, less protrusive rostrum, the condition reflected in shorter cranial length and incisive foramina. Other distinctions include narrower mesopterygoid fossa, and more inflated frontal sinuses (fig. 30).

Remarks. The obvious difference between *O. caparaoe* and *O. nasutus* is the dark brown or dominantly eumelanin outer parts of the first and the dominantly pale reddish or orange pheomelanin outer parts of the second. Expansion of the pheomelanic band of the agouti hairs in *O. nasutus* with corresponding decrease in width of the eumelanic band are derived conditions. Descriptions of *O. nasutus* have been provided by Vieira (1953), and Gyldenstolpe (1932).

Range of chromatic variation in *O. caparaoe* is extremely narrow and the probability that the species may be dichromatic or that it intergrades with the paler *O. nasutus* seems unlikely.

Fig. 30: Mt. Caparaó Hocicudo *Oxymycterus caparaoe* (MN 31997 ♀); A, skull; B, molars; GSL 34.3 mm; molars, 4.5 mm; Arrozal, Caparaó, Minas Gerais; compared with *Oxymycterus nasutus* (FM 27652 ♂); C, skull; D, molars; GSL, 33.3 mm; molars, 4.7 mm; Uruguay: San José, S. Ecilda.

The originally forested habitat of *O. caparaoe*, is now second growth and scrub. That of *O. nasutus* is scrub and/or savanna.

Table 13: Skeletal measurements and ratios x 100.

	Greatest Skull Length	Humerus	Ulna	Ulna Humerus	Femur	Humerus Femur	Tibia	Tibia Femur	Ulna + Humerus Tibia + Femur	Pelvis Greatest Length	Trunk	Femur Trunk	Ulna + Humerus Trunk	Tibia + Femur Trunk	Pelvis Trunk	Humerus Trunk	Ulna Trunk
Oxymycterus rufus																	
MN 32005	38.7	20	—	—	29	69	—	—	—	37	90	32	—	—	—	22	—
O. roberti																	
PH 9569	34.6	17	21	23	25	68	26	104	74	30	80	31	47	64	37	21	26
O. caparaoe																	
MN 31984	35.3	16	—	—	22	73	—	—	—	26	89	25	—	—	29	17	—
MN 31985	—	15	—	—	20	75	—	—	—	25	75	27	—	—	33	20	—
MN 31986	34.7	15	—	—	21	71	—	—	—	25	76	28	—	—	32	20	—
Brucepattersonius griserufescens																	
MN 32236	29.2	13	—	—	21	62	—	—	—	19	86	24	—	—	22	15	—
Delomys sublineatus																	
FM 141628	—	16	17	—	22	73	25	—	—	23	—	—	—	—	—	—	—
FM 141629	—	17	19	—	22	77	26	—	—	26	88	25	—	—	29	19	—
Delomys dorsalis																	
PH 10029	—	19	—	—	24	79	—	—	—	28	90	27	—	—	31	20	—
Thaptomys nigrita																	
MN 32175	33.9	12	—	—	13	92	—	—	—	18	47	28	—	—	38	25	—

Specimens examined: Total 30. Minas Gerais (Parque Nacional de Caparaó, Segredo 2100 m, MN 1; Vale Encantado, 1980 m, MN 17; Arrozal, 2300—2400 m, MN 7; Terreirão, 2400 m, MN 9; station unrecorded, MN 5).

Fig. 31: Diagrams of right and left upper molar crown patterns.

Explanation for symbols. Note: a—i inclusive = procingulum or loph I; s, t, z = postcingulum or loph V.

I—V. lophs of pentalophodont molars
a. anteromedian style (may be fused with b, c, or both)
b. anterolabial lophule
c. anterolingual lophule
d. anterolophule (may be fused with f)
e. anterior fossette
f. plesiostyle (may be fused with d, h, or j)
g. protostyle (may be fused with i)
h. anteroloph (may be fused with f, j, or both)
i. protoloph (may be fused with g, u, or both)
j. parastyle (may be fused with f, h, k, or a combination)
k. mesolophule (may be fused with h, j, or both)
l. paracone
m. paralophule (may be fused with n, o, or both); element may be multiplied
n. mesoloph (when fused with o = mesolophostyle)
o. mesostyle (may be fused with m, p, or both; when fused with n = mesolophostyle
p. metalophule (may be fused with o, n, or both)
q. metacone
r. posterolophule (may be fused with s)
s. posterostyle (may be fused with r, t, or both)
t. posteroloph (may be fused with s)
t'. posteroconule (may be fused with z, usually not differentiated from posteroloph, t)
u. protolophostyle (may be fused with i)
v. protocone
w. enteroloph (may be fused with x)
x. enterostyle (may be fused with w)
y. hypocone
z. distostyle
a'. median fossette (may be coalesced with 3, or united with 4)
b'. posterior fossette (may be coalesced with 5, or united with 6)
c'. protolophule
d'. hypolophule
e'. mure (border between lingual and labial cusps and lophs)

1. preflexus (anterior median fold)
2. anteroflexus (anterior secondary fold)
3. paraflexus (first primary fold)
4. mesoflexus (first secondary fold)
5. metaflexus (in absence of mesoloph [n] coalesced with first secondary fold [4])
6. posteroflexus (second secondary fold)
7. supraflexus (anterior lingual fold; in absence of protoloph coalesced with first minor fold [8])
8. protoflexus (first minor fold)
9. entoflexus (major fold)
10. hypoflexus (in absence of enteroloph coalesced with major fold [9])
11. distoflexus (second minor fold)

Skeleton

Bone measurements and ratios of the species of this report were intended to reflect locomotor and functional adaptations. It was found, however, that in most of the few available skeletons, distal ends of the long limb bones had been truncated and left with the foot bones in the prepared study skins (table 13). Convincing interpretations of form and function could not be derived from the partial data but the four complete proximal limb bones are instructive. *Thaptomys* with its extremely long humerus (humerus/femur) is fossorial. In contrast, the comparative length of the *Oxymycterus* humerus to femur does not indicate adaptation for digging.

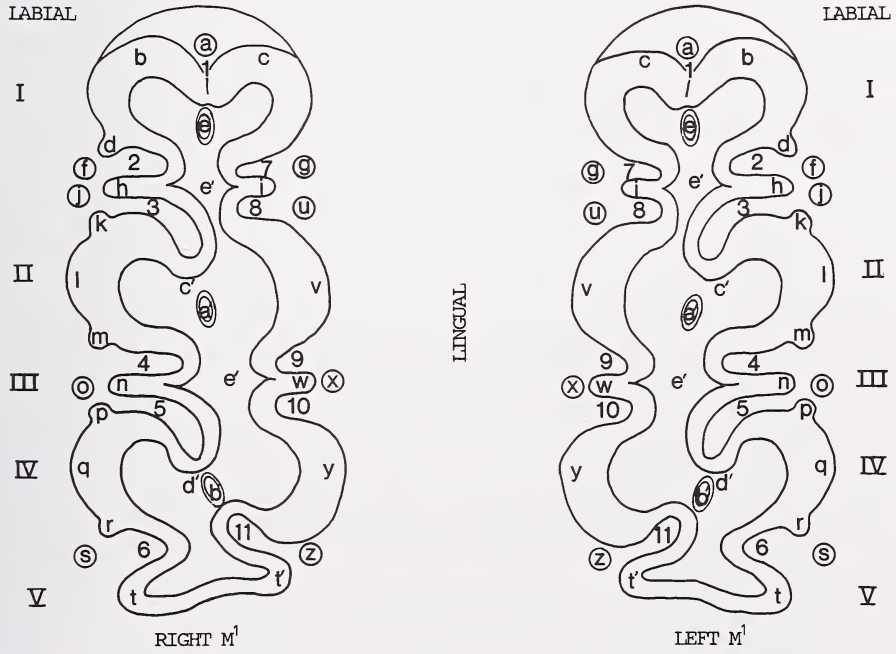
The vertebral count of the genera examined is the expected 7 cervical, 13 thoracic (rarely 12 or 14), 5 or 6 lumbar, sacrals 2 (*Thaptomys*), 3—6 (*Oxymycterus*), 2—3 (*Delomys*).

The entepicondylar foramen is absent in all sigmodontine species examined.

Articulation of the first rib may be with the first thoracic vertebra, the 7th cervical vertebra, or with both.

Sympatry

All individuals of the same genus living on the western or Minas Gerais slope of Mt. Caparaó from 1100 m upwards to the peak at approximately 2700 m, are regarded as sympatric. The congenerics actually taken in the same trapping stations are *Akodon mystax* and *A. serrensis* from Terreirão and Pico da Bandeira, and *Oxymycterus rufus* and *O. caparaoe* from the same two stations; *Brucepattersonius griserufes-*



cens and *B. albinasus* were trapped at Pico da Bandeira. Each of the remaining species of this report may not have a congeneric in the Parque de Caparaó or it remains to be discovered.

Fig. 32: Diagrams of right and left lower molar crown patterns.

Explanation for symbols. Note: a—h inclusive = procingulid or lophid I; a', r, r' = postcingulid or lophid V.

I—V. lophids of pentalophodont molars
a. anteromedian stylid (may be fused with b, c, or both)
b. anterolabial conulid (may be fused with c)
c. anterolingual conulid (may be fused with b)
d. labiolophulid (may be fused with g)
e. anterior fossette
f. anterolophulid (may be fused with h, i, or both)
g. prostylid (may be fused with d)
h. anterolophid (may be fused with f, i, s, or combination)
i. anterostylid (may be fused with f, h, s, or combination)
j. protoconulid (may be fused with g)
k. protoconid
l. paralophulid (may be fused with m, n, or both)
m. ectostylid (may be fused with l, n, o, or combination)
n. ectolophid (may be fused with l, m, o, or combination)
o. hypoconulid (may be fused with m or n)
p. hypoconid
q. posterolophulid (may be fused with r')
r'. posterolophid (may be fused with q)
r. posteroconulid (usually not differentiated from posterolophid, r')
s. mesolophulid (may be fused with h)
t. metaconid
u. metalophulid (may be fused with v, w, or both)
v. mesolophid (when fused with w = mesolophostylid)
w. mesostylid (when fused with v = mesolophostylid)
x. entolophulid (may be fused with v, w, or both)
y. entoconid
z. distolophulid (may be fused with a')

a'. posterostylid
b'. median fossetid
c'. posterior fossetid
d'. protolophulid
e'. hypolophulid
f'. murid (zone between lingual and labial lophids and cuspids)

1. preflexid (anterior median fold)
2. anteroflexid (anterior lingual fold; in absence of anterolophid [h] coalesced with 3)
3. metaflexid (first secondary fold)
4. mesoflexid (first primary fold)
5. entoflexid (second secondary fold; in absence of mesolophid [v], coalesced with 4)
6. posteroflexid (second primary fold)
7. supraflexid (anterior labial fold; in absence of labiolophulid [d] coalesced with 8)
8. protoflexid (first minor fold)
9. ectoflexid (major fold)
10. hypoflexid (in absence of ectolophid [n] coalesced with 9)
11. distoflexid (second minor fold).

Dental patterns

Patterns of the sigmodontine upper and lower first molar crowns are shown diagrammatically in figures 31 and 32. The terminologies for the dental elements follow. The same diagrams serve for the identification of the enamel elements and folds or flexi (ids) of all muroid molars.

Lettering and numbering of dental elements for right and left upper and lower molars are the same but reversed. Because of differences between stationary upper and moving lower molars the symbols are not the same for most apparently homologous upper and lower elements. Numbers for the enamel folds or flexi (ids) remain the same for upper and lower molars but reversed for right and left.

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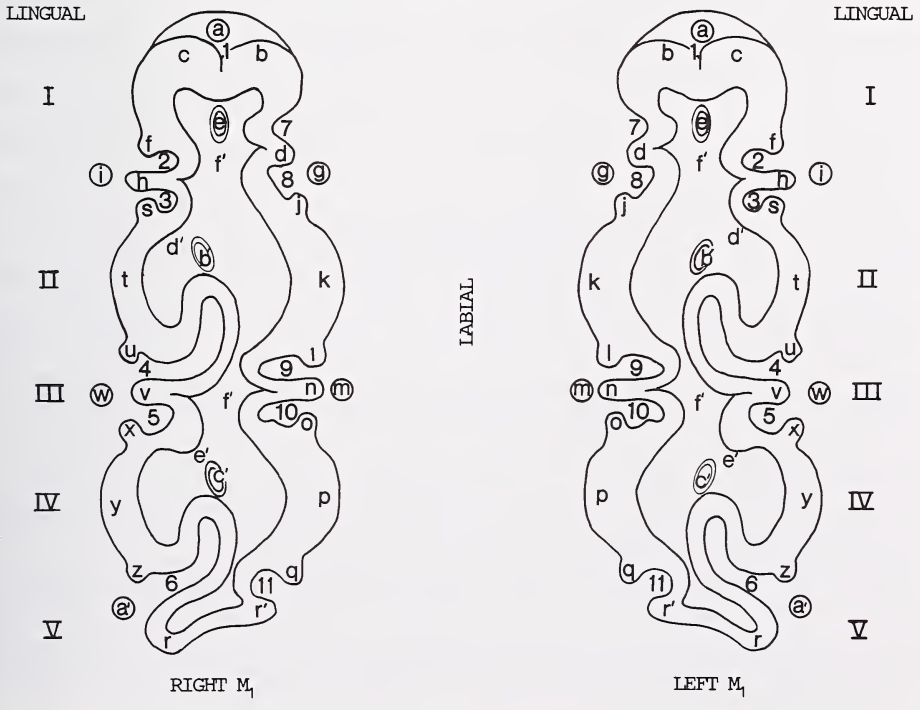

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Zusammenfassung

In diesem Report wird über einen Teil der Aufsammlungen von Kleinsäugern im Iporanga State Park, São Paulo, im Parque Nacional de Caparaó, Minas Gerais-Espírito Santo, und an einigen Lokalitäten in Südost-Brasilien, die nicht vom Vefasser selbst besucht wurden, berichtet. Beschreibungen werden gegeben von fünf Gattungen (davon eine neu) und 14 Arten (6 neue, 1 noch unbeschrieben) sigmodontiner Nagetiere. Zwei frühere Berichte von anderen Autoren über Säugetiere des Caparaó National Park werden kritisch besprochen.

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