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A new species of Spiny rat genus *Proechimys*, subgenus *Trinomys* (Rodentia: Echimyidae)

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Abstract

Described a new species of spiny rat genus *Proechimys*, subgenus *Trinomys* based on seven specimens collected in Conceição do Mato Dentro, state of Minas Gerais, southeastern Brazil. The diagnostic characters of the new species are an elongate and posteriorly wide incisive foramen and a baculum with weakly developed apical wings. This new species differs from previously described species of the subgenus by a set of characters including the color of the pelage and skull, teeth, and bacular morphology.

Introduction

The genus *Proechimys* comprises the subgenera *Proechimys* Allen, 1899 and *Trinomys* Thomas, 1921 which are distinguished by a series of cranial, dental, and body traits. In the subgenus *Trinomys* the main fold of the molariform teeth extends entirely across the worn crown and the size of teeth decreases progressively from the premolar to the third molar. The ridges of the skull are moderately developed, and the infraorbital foramen lacks a groove for transmission of the nerve (MOOJEN 1948). The two subgenera have disjunct distributions, with the subgenus *Proechimys* ranging from Nicaragua to northern Paraguay, whereas the subgenus *Trinomys* occurs in the Atlantic forest of eastern Brazil (Fig. 1).

Four species are currently recognized for the subgenus *Trinomys*, namely *Proechimys dimidiatus* (Günther, 1877), *Proechimys iheringi* Thomas, 1911, *Proechimys setosus* (Desmarest, 1817) and *Proechimys albispinus* (Geoffroy, 1838). A fifth species, *Proechimys myosurus* (Lichtenstein, 1830), was thought by MOOJEN (1948) to be related to *P. albispinus* or even a synonym of this form. The monograph by MOOJEN (1948) has remained a unique source for the study of systematics in the subgenus *Trinomys*. We have started a detailed analysis of the variation and systematics of this subgenus (PESSÔA 1989; PESSÔA and REIS 1990; REIS et al. 1990; PESSÔA and REIS 1991a, b, c, d; REIS et al. 1991) and have come upon a species distinguishable from all the forms so far recognized for *Trinomys*. In the present study, we describe this new form of *Proechimys* from the state of Minas Gerais, Brazil.

Material and methods

The specimens of *Proechimys dimidiatus*, *P. iheringi*, *P. setosus*, and *P. albispinus* used for comparisons with the new species were identified with the aid of MOOJEN's (1948) diagnoses for cranial and pelage characteristics. Hair terminology follows MOOJEN (1948) and hair measurements were taken with an eyepiece micrometer. Capitalized color definitions follow RIDGWAY (1912). Cranial measurements defined by MOOJEN (1948) were taken with digital calipers graduated to 0.01 mm, and external measurements (length of head and body, length of tail, length of hind foot, and length of ear) were

obtained from skin tags. Descriptions of bacular morphology were taken from PESSÔA and REIS (1991d).

Specimens examined are housed in the Museu Nacional (MN), Museu de História Natural da Universidade Federal de Minas Gerais (MHN), and Museu de Zoologia da Universidade de São Paulo (MZUSP), and are listed as follows: *Proechimys dimidiatus* (Rio de Janeiro: Tijuca [MN 10344, 10355, 10359, 10362, 10366, 10367, 12814]); *Proechimys iheringi iheringi* (São Paulo: Ilha de São Sebastião [MZUSP 218, 221, 222, 2095, 2145, 2146, 2525, 3201, 10072]); *Proechimys iheringi bonafidei* (Rio de Janeiro: Teresópolis [MN 6179, 6181–6183, 6187, 6780, 6782, 6784, 6786, 6787]); *Proechimys iheringi graciosus* (Espírito Santo: Floresta da Caixa Dagua [MN 4018, 5430, 5656, 5674, 5757, 5759, 5767, 5772]); *Proechimys iheringi paratus* (Espírito Santo: Capela de São Braz [MN 4012, 4023, 5455, 5458]); *Proechimys iheringi panema* (Espírito Santo: Campinho [MN 8284–8288]); *Proechimys iheringi denigratus* (Bahia: Itabuna [MN 10474, 10476, 10477, 10515, 10517, 10519, 10521, 10523–10525, 10528]); *Proechimys albispinus* (Bahia: Jequié [MN 13966, 13967, 13969, 14009, 14012, 14013, 14016]); *Proechimys setosus* (Minas Gerais: Santa Bárbara [MHN 131, 149, 870]).

Results

Proechimys moojeni, new species

Holotype: 13380, MN; skull and skin of an adult female specimen; collected by CORY T. CARVALHO, field number 138, on 25 August 1954.

Type locality: Mata do Dr. DANIEL, Conceição do Mato Dentro, Minas Gerais, Brazil; 19° 01'S, 43° 25'W (Fig. 1).

Other specimens: Six skins and skulls, three from Mata do Dr. DANIEL and three from Boca da Mata in Conceição do Mato Dentro.

Distribution: Known only from the type locality.

Diagnosis: A *Proechimys* distinguished from all previously described species of the subgenus *Trinomys* by the presence of an elongate and posteriorly wide incisive foramen, two counterfolds in upper and lower molariform teeth, baculum with weakly developed apical wings.

Description

Pelage. – Aristiforms on middorsal region: grayish basally, gradually blackening toward tip; total length (mean = 20.35, range = 19.04–21.98); maximum width (mean = 0.63, range = 0.45–0.73). Aristiforms on outer thighs: Two color types of aristiforms, both whitish basally, becoming gray in the median part, one Ochraceous Buff through the tip and the other gradually blackening toward the tip; total length (mean = 15.85, range = 14.02–18.84); maximum width (mean = 0.46; range = 0.35–0.66). Setiforms on middorsal region: whitish basally, gradually blackening toward tip but interrupted by an Ochraceous Orange subapical zone 2.35 to 5.85 long (mean = 3.89); total length (mean = 17.09, range = 15.58–18.78); maximum width (mean = 0.14, range = 0.13–0.15). Setiforms on outer thighs: Gray basally, gradually blackening toward tip interrupted by an Ochraceous Orange subapical zone 2.12 to 3.60 long (mean = 2.78); total length (mean = 13.27, range = 11.85–15.27); maximum width (mean = 0.12, range = 0.10–0.15). General color on upper parts and sides orange brown due to a combination of blackish from the tips of aristiforms and Ochraceous Orange ground color from the subapical zone of setiforms. Differentiated light-colored aristiforms on outer sides of thighs and rump. Tail bicolored, white below and brown above in the anterior two-thirds, tail tip white (Fig. 2).

Skull. – Elongate and slightly convex; bullae small and smooth; rostrum short but not stout; transverse ridge of jugal bones not well developed; postorbital process of zygoma well developed and formed by jugal and squamosal bones; incisive foramen elongate and posteriorly wide; vomerine sheath incomplete and formed almost exclusively by premaxillae; maxillary part of the vomerine sheath short; posterior palatine foramina at anterior plane of first molars; mesopterygoid fossa extending forward as far as the anterior plane of second molars (Fig. 3). Skull and body measurements are given in Table 1.



Fig. 1. Map showing the distribution of the two subgenera of the genus *Proechimys* (after MOOJEN, 1948). The black star denotes the type locality of the new species of *Proechimys*

Teeth. – Incisives orthodont, upper and lower molariform teeth with two counterfolds (Fig. 4).

Baculum. – Elongate and narrow with a straight shaft. Shaft with a slight dorsoventral curvature and a tapered lateral indentation near mid-shaft. Proximal end straight and paddle-shaped. The distal end has weakly developed apical wings (Fig. 5).

Comparisons: *Proechimys moojeni* shares with *P. iheringi*, *P. albispinus*, and *P. setosus* the aristiform hairs wide and stiff as opposed to *P. dimidiatus*, whose aristiforms are narrow and soft. The tail is shorter in *P. moojeni*, *P. dimidiatus*, and *P. albispinus*, and longer in *P. iheringi* and *P. setosus*, where it is associated with a penicillated tip. *Proechimys moojeni*, *P. dimidiatus*, and *P. iheringi* have longer and slightly convex skulls, whereas in *P. setosus* and *P. albispinus* the skull is shorter and conspicuously convex. The incisive foramen is posteriorly constricted in *P. iheringi*, *P. setosus*, and *P. albispinus* and widest posteriorly in *P. dimidiatus* and *P. moojeni* (Fig. 6). The latter species differ by the length



Fig. 2. Study skin of the holotype of *Proechimys moojeni* (MN 13380)

Measurements (in mm) of adults of *Proechimys moojeni*

Specimen numbers	13366	13368	13372	13376	13379	13382	13380
Sex	F	M	M	M	F	M	F
Length of head and body	180	165	148	170	151	178	170
Length of tail	160	160	144	163	—	172	162
Length of hind foot	44	44	40	43	42	44	43
Length of ear	25	22	22	25	21.5	24	23
Greatest length of skull	51.2	50.7	45.6	51.8	51.2	50.6	50.4
Condylar-incisive length	36.6	34.8	31.7	36.6	36.1	35.6	35.4
Zygomatic breadth	26.5	25.2	24.5	25.9	25.4	24.4	25.0
Length of nasals	18.7	16.5	16.3	18.9	18.1	17.3	17.3
Interorbital constriction	12.0	12.2	10.7	12.3	12.3	12.0	11.8
Palatal length	17.3	16.1	14.4	15.6	16.8	16.2	15.4
Length of upper toothrow	9.0	8.6	7.8	8.2	8.3	8.4	8.6
Length of incisive foramen	4.3	5.0	3.8	4.7	4.5	4.3	4.7
Width of incisive foramen	2.3	2.2	1.8	2.5	2.4	2.4	2.2

of the foramen, which is short in *P. dimidiatus* and longer in *P. moojeni*. In *Proechimys dimidiatus* the vomerine sheath is complete, whereas it is incomplete in *P. moojeni*. *Proechimys moojeni* always has two counterfolds in all molariform teeth in the specimens examined, whereas *P. albispinus* always shows one. The number of molariform counterfolds varies in the remaining species. In *P. dimidiatus* and *P. iberingi* this number varies from two to three, whereas in *P. setosus* it varies from one to two. The baculum in *P. moojeni* differs from *P. dimidiatus*, *P. iberingi* and *P. setosus* by the presence of apical wings. From *P. albispinus* it is distinguished by its smaller size and less developed apical wings (PESSÔA and REIS 1991d).

Etymology: The name *moojeni* is given to honor Dr. JOÃO MOOJEN, whose outstanding and pioneer work laid the foundations for the study of the systematics and evolution of the genus *Proechimys*.

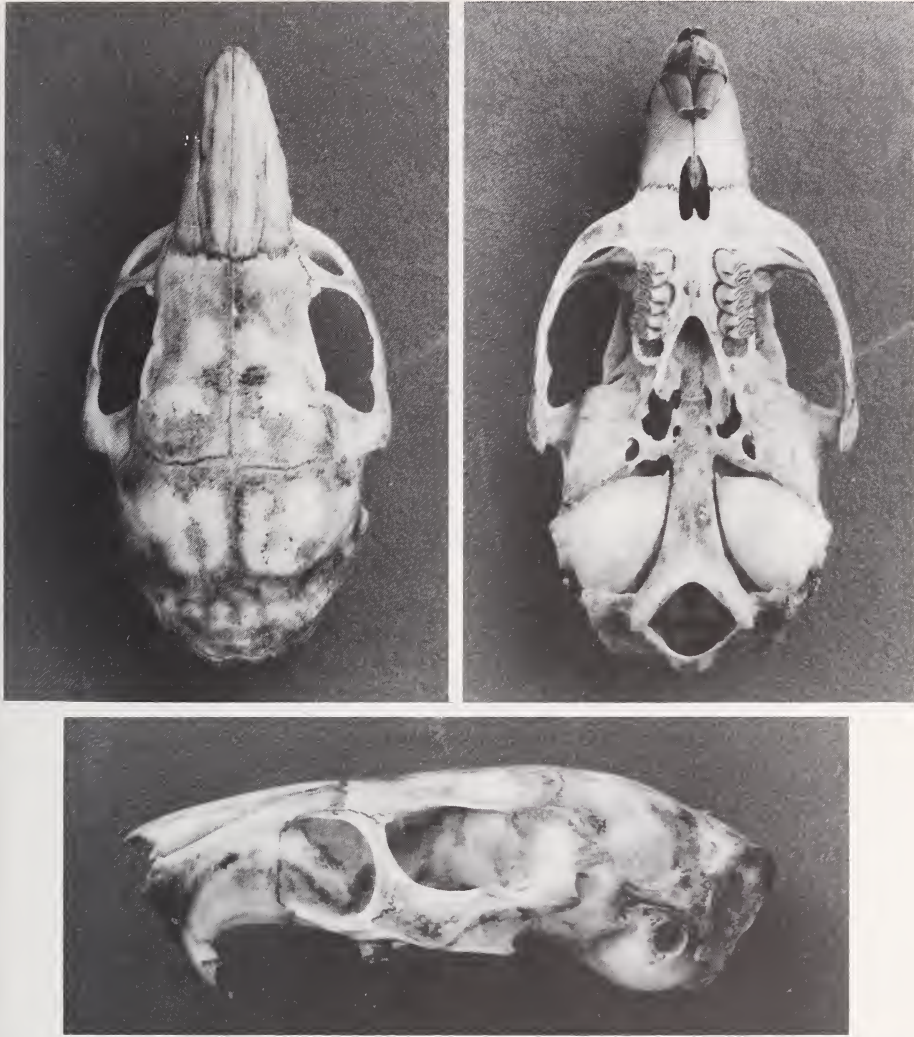


Fig. 3. Dorsal, ventral, and lateral views of the skull of the holotype of *Proechimys moojeni* (MN 13380)

Discussion

In his detailed systematic analysis of the genus *Proechimys*, MOOJEN (1948) defined the morphological limits of variation at the subgeneric, specific, and infraspecific levels. MOOJEN (1948) employed the thickness and color of aristiform hairs, the size and shape of the skull, the shape and structure of the incisive foramen, and the number of molariform counterfolds to define the limits of variation between species in the subgenus *Trinomys*. MOOJEN (1948) combined these traits to characterize the species of *Trinomys* and apparently no single character could uniquely diagnose the species in the subgenus *Trinomys*. Nevertheless, close inspection of the shape and structure of the incisive foramen allows the unambiguous recognition of each species. The premaxilla and the maxilla form a bridge



Fig. 4. Upper right molariform teeth of a paratype of *Proechimys moojeni* (MN 13379)

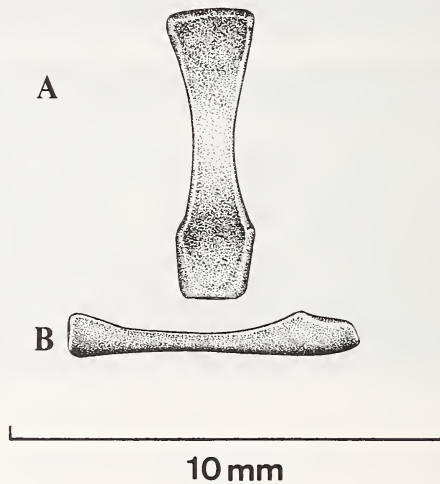


Fig. 5. Ventral (A) and lateral (B) views of the baculum of *Proechimys moojeni*. The distal part is put to the top (ventral view) and to the left (lateral view)

that crosses the incisive foramen longitudinally. The premaxillary part is always well developed, whereas the degree of development of the maxillary part shows considerable variation (MOOJEN 1948). A complete vomerine sheath occurs when the premaxillary and maxillary parts meet. In *P. dimidiatus* the vomerine sheath is complete and the maxillary part is wide and well developed. In *P. iheringi* the vomerine sheath can be either complete or incomplete with a short maxillary part. The vomerine sheath is complete in *P. setosus* and *P. albispinus*. The maxillary part is short and slender in *P. setosus*. The premaxillary part of the vomerine sheath in *P. albispinus* is on a level lower than that of the maxillary

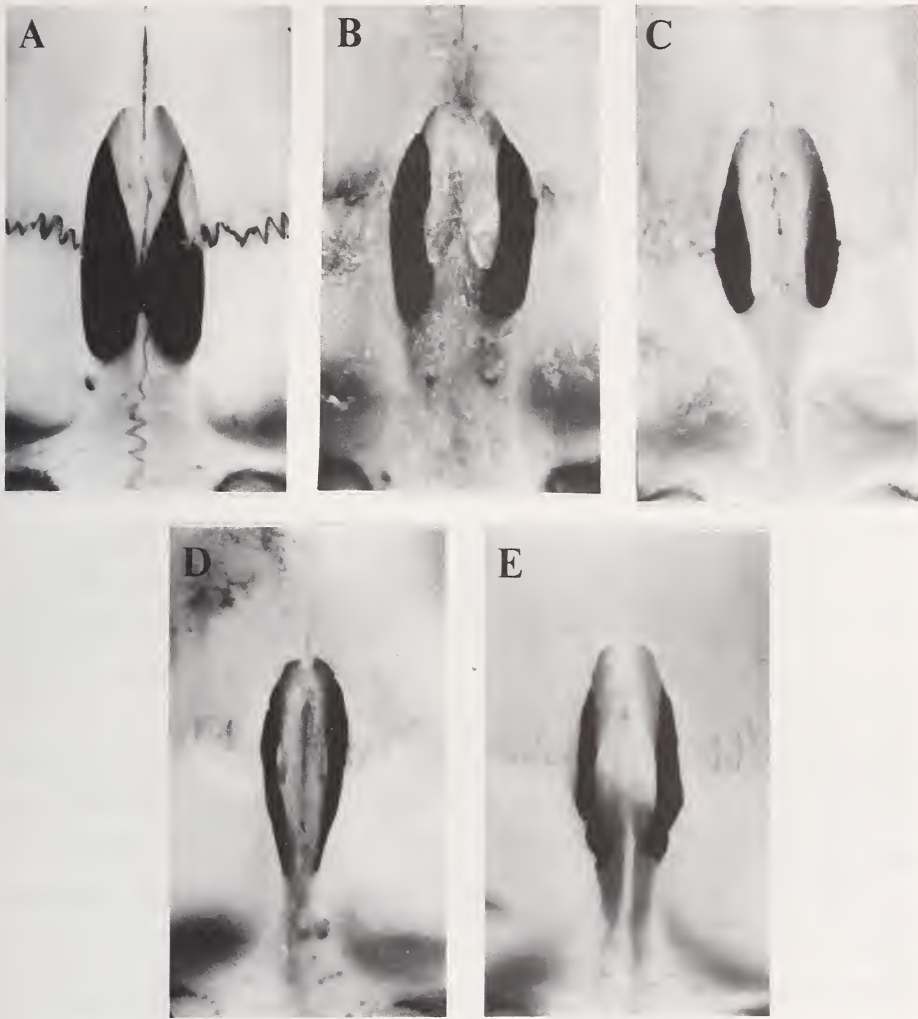


Fig. 6. Representative incisive foramina of species of the subgenus *Trinomys*, genus *Proechimys*. A: *P. moojeni*; B: *P. dimidiatus*; C: *P. iheringi*; D: *P. setosus*; E: *P. albispinus*

part, which is keeled. In *P. moojeni* the vomerine sheath is incomplete with a short maxillary part.

Recent studies have shown that bacular morphology can also be used to diagnose species of the subgenus *Trinomys* (PESSÔA and REIS 1991d). Although several morphological characters have been combined to characterize the species of *Trinomys*, the shape and structure of the incisive foramen and the size and shape of the baculum are good characters to define species at the morphological level in this subgenus.

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Zusammenfassung

Eine neue Art von Stachelratten des Genus Proechimys, Subgenus Trinomys (Rodentia: Echimyidae)

Beschrieben wird eine neue Art der Stachelratten, *Proechimys (Trinomys) moojeni*. Die Typenserie umfaßt sieben Exemplare von Conceição do Mato Dentro aus dem Staat Minas Gerais in Südost-Brasilien.

Kennzeichnend sind vor allem lange und hinten breite Foramina incisiva sowie ein Baculum mit schwach entwickelten apikalen Flügeln. Außerdem unterscheidet sich die Art von den anderen, bisher bekannten *Proechimys*-Arten in der Fellfärbung, in der Zahnmorphologie und weiteren Merkmalen des Schädels und des Baculums.

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