

A NEW SPECIES OF WATER RAT, GENUS *NEUSTICOMYS* ANTHONY,  
FROM THE ANDES OF VENEZUELA

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**ABSTRACT.**—A new species of water rat of the genus *Neusticomys* is described, based on two specimens collected on the southern slope of the Venezuelan Andean Cordillera in the Río Potosí, 14 km SE Pregonero (Táchira State). The diagnostic characters of this new taxon include small size, short molar series, a reduction of the pollex, and poorly developed masseteric tubercles. By comparison with other ichthyomyines, the new species appears less specialized for aquatic life as indicated by relatively narrower hindfeet (with shorter specialized hairs and webs), moderately developed vibrissae, a reduced gnathic process of the premaxillae, and a more compressed infra-orbital toramen

With publication of a recent monograph on the systematics and ecology of ichthyomyine rodents (Voss, 1988), the biology of this interesting group of Neotropical water rats was substantially documented. In the current taxonomy, summarized by Voss (1988), five genera and 14 species are recognized, of which four species are included in the genus *Neusticomys*: *N. monticolus* (Anthony, 1921), previously the sole member of the genus, for which the distribution embraces the northern Andean Cordillera (Ecuador and Colombia) at elevations of 1,800–3,750 m; *N. venezuelae* (Anthony, 1929), recorded from northeastern and southern Venezuela and northern Guyana at 9–1,400 m elevation; *N. peruvensis* (Musser and Gardner, 1974), known only from the type locality in the Amazonian lowlands of Peru; and *N. oyapocki* (Dubost and Peter, 1978), recorded only by the holotype from southern French Guiana. The last three species were formerly assigned by other authors to the genus *Daptomys* (Honacki et al., 1982; Voss, 1988).

In the Colección de Vertebrados de la Universidad de los Andes (Mérida State), in Venezuela, two specimens from the southwestern slope of the Venezuelan Andean Cordillera were found for which external, cranial, and dental characters correspond to *Neusticomys* (Voss, 1988). However, these specimens were not referable to previously known species of that genus and apparently represent a new species described herein.

All measurements and age criteria cited herein follow Voss (1988). The specimens examined were deposited in the following institutions: the American Museum of Natural History (AMNH), the Colección de Vertebrados de la Universidad de los Andes (CVULA), the Colección de la Estación Biológica de Rancho Grande (EBRG), and the Museo de Biología de la Universidad Central de Venezuela (MBUCV).

*Neusticomys mussoi*, new species

**Holotype.**—A male (dry skin, skull, and partial postcranial skeleton: CVULA-I-1638) with adult pelage, fused sphenoccipital suture, and heavily worn molars (tooth wear class 5). Collected by Robinson Pérez in February 1985 at Paso Hondo, Río Potosí, 14 km SE Pregonero, Táchira, Venezuela (7°57'N, 71°39'W), 1,050 m elevation.

**Paratype.**—A female (dry skin, skull and partial postcranial skeleton: CVULA-I-1637) with adult pelage, fused sphenoccipital suture, and slightly worn molars (tooth wear class 2). The same collector, date, and locality as the holotype.

**Etymology.**—The epithet *mussoi* honors the memory of Andres Musso, a pioneer of Venezuelan mammalogy, who devoted much of his life to the education and encouragement of many young Venezuelan mammalogists.

*Distribution.*—Known only from the type locality.

*Diagnosis.*—The ichthyomyine species least specialized for aquatic life, as indicated by: hind feet the narrowest of the group, with shorter fringing hairs and interdigital webs; mystacial vibrissae moderately developed; gnathic process small; and shape of the infraorbital foramen lumen relatively compressed. Voss (1988) discussed the functional implications of these features. In addition, *N. mussoi* can be differentiated from other species of the genus *Neusticomys* by its smaller size, shorter molar series (Table 1), greater reduction of the pollex, and a scarcely developed masseteric tubercle.

*Description.*—Length of head and body is 94–118 mm. Body pelage brownish, bright, dense, and soft. Dorsal fur consisting fundamentally of shorter hairs (6 mm long) with the tips reddish-brown, and scattered longer hairs (8 mm long) with black tips; both having the basal 75% gray (in the holotype there are two small patches of entirely white hairs; one on the left flank and the other on the left shoulder). Ventral fur shorter (4 mm long) and paler than that of the dorsum, but slightly grayer, with longer scattered hairs (6 mm long) having golden tips. Philtrum present. Mystacial vibrissae short, sparse, soft, and entirely whitish. Pinnae conspicuous, small, rounded, and furred on both sides, with the inside part yellowish, contrasting in color with the dorsal fur. Manus cream-colored on the dorsal and ventral sides with three separate interdigital pads and two separate carpal pads; pollex highly reduced and below the lower level of the first interdigital pad. Hind feet narrow, similar to terrestrial sigmodontine species, with the first and fifth digits extending just a little beyond the first interphalangeal joint of digits two and four, the upper side cream-colored and the plantar side brownish, the interdigital webs imperceptible in dry skins, and the stiff hairs along the metatarsal margins and between the digits weakly developed. Tail shorter than head and body, densely covered by dark-brownish hairs, and with a patch of entirely white hairs at the tip.

Incisors morphologically similar to those of *N. venezuelae*: the upper incisors broad and heavy, with sharp tips, and medially inclined anterior surfaces. Molars 3/3; first and second molars moderately rounded and anteroposteriorly compressed cusps. Maxillary and mandibular tooth-rows short (Table 1; Figs. 1e and 2b); M3 and m3 average 15.2–17.6% and 21.2–21.9% of their respective series; m3 lacks the entoconid and hypoconid.

Skull similar to that of *N. venezuelae* (Figs. 1 and 2); robust in appearance and with flattened dorsal profile, showing only a subtle depression near the level of the interorbital constriction. Rostrum broad and heavy with only the tips of the nasolacrimal capsules exposed in dorsal view. Nasals flat, slightly compressed laterally, and extending posteriorly to the level of the first molars. Interorbital constriction broad, concealing the molars in dorsal view. Braincase slightly inflated with scarcely developed lambdoidal ridges; tips of the occipital condyles visible in dorsal view. Zygomatic arches incompletely ossified; inferior zygomatic root broad with the posterior edge lying anterior to the first molar. Gnathic process and masseteric tubercle reduced. Supraorbital foramina open in the lateral surface of the frontals, within the orbits. Palatal bridge proportionately narrow (Table 1; Fig. 1e). Incisive foramina extends posteriorly beyond the masseteric tubercle, near the anterocones of the first molars. Lumen of the infraorbital foramen relatively compressed. Postglenoid foramen narrow dorsoventrally and expanded anteroposteriorly (similar to *N. venezuelae*). Auditory bullae slightly inflated. Carotid arterial supply resembles that described by Voss (1988:296) as pattern 1. Mandible has the tips of the angular processes behind the articular condyle.

*Comparisons.*—Morphologically, *N. mussoi* appears to be more closely related to *N. venezuelae* and to other species formerly included in *Daptomys*, than to *N. monticolus* (Figs. 1 and 2). The most conspicuous similarities supporting this conclusion are: brownish body pelage, broad and heavy upper incisors, relatively smaller molars, skull robust with heavy and broad rostrum, nasals slightly compressed laterally, braincase slightly inflated and flattened in dorsal profile, tips of the occipital condyles visible in dorsal view, palatal bridge proportionately narrow, and the angular process of the mandible extending behind the articular condyle. However, *N. mussoi* can be differentiated from *N. venezuelae*, *N. oyapocki*, and *N. peruvienis* by its much smaller

TABLE 1.—Mean, range, and sample size for external and cranial measurements (in mm) of *Neusticomys mussoi*, *N. venezuelae* (Venezuela), and *N. monticolus* (Ecuador).

Character	<i>N. mussoi</i> <sup>a</sup>			<i>N. venezuelae</i> <sup>b</sup>			<i>N. monticolus</i> <sup>c</sup>		
	$\bar{x}$	Range	n	$\bar{x}$	Range	n	$\bar{x}$	Range	n
Length of head and body	106	94-118	2	125.5	124-127	2	113.5	112-116	4
Total length	187.5	175-200	2	245.5	243-248	2	208.3	192-223	4
Length of hind foot	21		2	28		2	25.3	24-26	4
Length of ear	10		2	12		1	9.8	9-10	4
Condylolincisive length	24.4	24.1-24.7	2	28.6	27.9-29.3	2	23.9	22.0-24.9	4
Length of diastema	6.2		2	7.3	7.0-7.6	2	6.1	5.0-6.3	4
Length of upper toothrow	3.4	3.3-3.4	2	4.8	4.2-4.3	2	4.0	3.9-4.1	4
Length of incisive foramina	4.7	4.6-4.8	2	5.6	5.4-5.7	2	4.5	4.2-4.9	4
Breadth of incisor tips	1.8	1.6-1.9	2	1.9	1.8-2.0	2	1.4	1.2-1.5	4
Breadth of incisive foramina	1.8		2	2.1	2.0-2.1	2	2.1	1.9-2.2	4
Breadth of palatal bridge	2.6	2.5-2.6	2	3.0	2.9-3.1	2	2.9	2.4-3.1	4
Length of nasals	9.5		1	12.3	12.2-12.3	2	8.8	7.5-9.6	3
Breadth of nasals	3.3		2	3.6	3.5-3.6	2	2.9	2.5-3.1	4
Least interorbital breadth	4.6	4.5-4.6	2	5.4		1	5.0	4.9-5.1	4
Zygomatic breadth	12.3	12.2-12.3	2	14.3	14.0-14.5	2	12.7	11.7-13.3	4
Breadth of braincase	11.0		2	12.9	12.8-13.0	2	11.8	11.5-12.2	4
Breadth of zygomatic plate	1.1		2	1.4	1.2-1.5	2	1.1	1.0-1.1	4
Breadth of M1	1.2		2	1.5		2	1.4		4
Height of incisors	4.2	4.1-4.3	2	4.9	4.8-4.9	2	4.5	4.0-5.1	4
Depth of incisors	1.5		2	1.8	1.7-1.8	2	1.4	1.2-1.4	4
Breadth across occipital condyles	6.4	6.2-6.5	2	7.5	7.0-8.0	2	7.1	6.9-7.5	4

<sup>a</sup> CVULA 11637 and 1638<sup>b</sup> EBRG 15951 and 15973.<sup>c</sup> AMNH 64625, 64629, 64632, and 64646.



FIG. 1.—Dorsal and ventral views of crania of *Neusticomys venezuelae* (a and d, EBRG 15951); *N. mussoi* (b and e, holotype, CVULA I-1638); and *N. monticolus* (c and f, AMNH 64629).

size (Table 1), narrower and less specialized hind feet, smaller pollex, reduced gnathic process, shorter molar series, scarcely developed masseteric tubercle, and more compressed lumen of the infraorbital foramen.

With respect to *N. monticolus*, *N. mussoi* is similar in size, yet both species are clearly different in some measurements related to the size of the teeth and the breadth of the skull, including the rostrum and the braincase (Table 1). In addition, *N. mussoi* is easily distinguished from *N.*

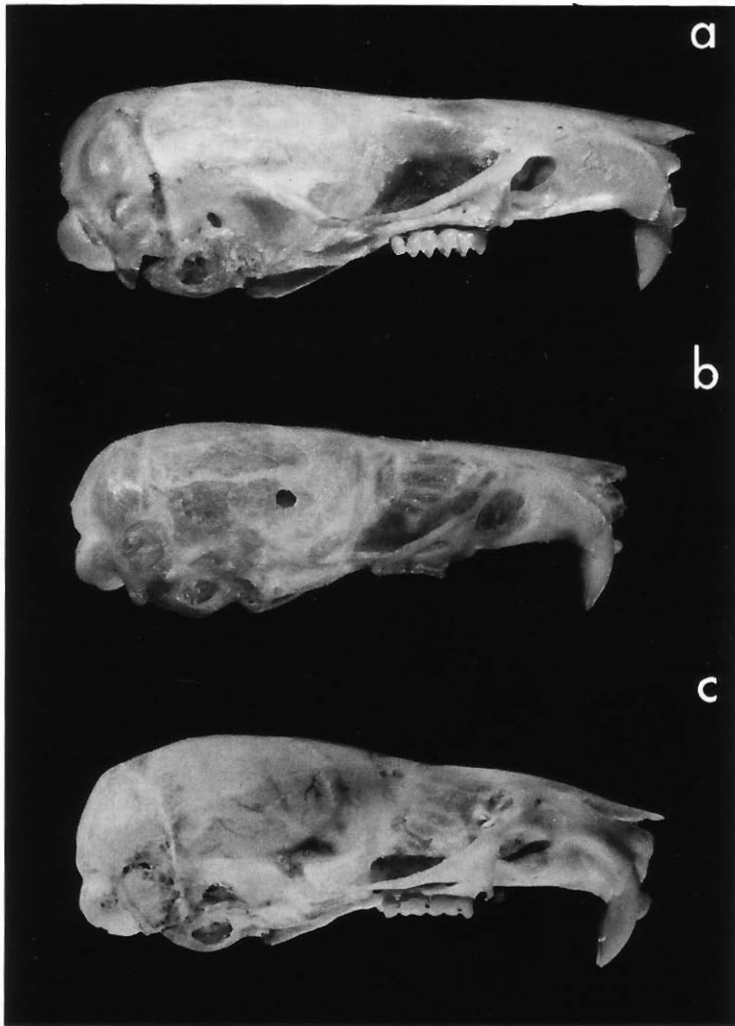


FIG. 2.—Lateral views of crania of *Neusticomys venezuelae* (a, EBRG 15951); *N. mussoi* (b, holotype, CVULA I-1638); and *N. monticolus* (c, AMNH 64629).

*monticolus* by its: brownish pelage (grayish in *N. monticolus*); pinnae with the internal side yellowish, contrasting with the coloration of the dorsal fur (gray-blackish and not contrasting in *N. monticolus*); pollex shorter; skull flatter in dorsal profile and stronger in appearance (Figs. 1 and 2), with the nasals slightly compressed laterally; braincase less inflated; tips of the occipital condyles exposed dorsally; upper incisors broader and heavier to contrast to the proportionally shorter maxillary and mandibular toothrows, and narrower palate; lumen of the infraorbital foramina narrower; gnathic process and masseteric tubercle reduced; postglenoid foramen narrower dorsoventrally and expanded anteroposteriorly; m3 without the entoconid-hypoconid cusp pair; and mandible with the angular process extending behind the articular condyle.

*Additional comments.*—The dental morphology of *N. mussoi* (broad and heavy incisors with sharp tips, and proportionally reduced molars) suggests that the diet of this species could correspond to that of other ichthyomyiines with the same dental features (*Ichthyomys pittieri* and *I. tweedii*—Voss, 1988), selecting relatively large arthropods protected by heavily sclerotized exoskeletons. Such prey initially may be reduced to ingestible fragments with the incisors, thereby diminishing the necessity of molar action to crush the hardest structures.

In Potosí, *N. mussoi* was sympatric with *Ichthyomys hydrobates* (CVULA-I-1636), a species with similar dental morphology, but with highly developed adaptations for aquatic life (Anthony, 1929; Voss, 1988) that may be related to differential habitat use. Foraging by *N. mussoi* could be directed to the consumption of semiaquatic or allochthonous prey encountered along the edges of streams, showing a more opportunistic trophic strategy, indicated by its less specialized morphology.

In another of the less specialized ichthyomyine species, *N. venezuelae*, collected by one of us (JOG) from a stream in lowland semideciduous forest (600 m elev.) in southern Venezuela (Ochoa et al., 1988), the stomach contents of two specimens included terrestrial and semiaquatic items (C. Marrero and J. Sánchez, pers. comm.): insects (Coleoptera, Orthoptera, and Diptera), crabs (Pseudoscorpionidae), and frogs (*Leptodactylus*). An equivalent trophic niche could characterize *N. mussoi* in habitats with similar ecological conditions to those of *N. venezuelae*.

The typical vegetation at Potosí is montane semideciduous forest, limited at the present time to the edges of streams and rivers. The remaining area has secondary vegetation as a result of human activities. Probably *N. mussoi* inhabits similar ecosystems at middle elevations elsewhere in the northern Andean Cordillera, where it must be a restricted and difficult-to-catch species, such as reported for other ichthyomyines (Musser and Gardner, 1974; Ochoa et al., 1988; Voss, 1988). Besides the two specimens reported herein, no additional specimens were collected despite an effort of 612 trap-nights applied in several streams at the same locality during one sampling period of 6 nights. Other nonvolant small mammals collected at this locality were: *Monodelphis adusta*, *Marmosa dryas*, *M. marica*, *Sciurus granatensis*, *Heteromys anomalus*, *Oryzomys albigularis*, *O. caliginosus*, *O. minutus*, and *Neacomys tenuipes*.

The addition of *N. mussoi* to the ichthyomyine fauna of the northern Andes is consistent with the proposal of Reig (1984) and Voss (1988), who considered this region as the center of diversity for these rodents. With *N. mussoi*, the number of ichthyomyine taxa occurring in Venezuela is increased to three genera and five species, including *Chibchanomys trichotis*, *Ichthyomys pittieri*, *I. hydrobates*, and *Neusticomys venezuelae*; however, it is possible that *N. monticolus* or an ecological equivalent also occurs in forest and paramo ecosystems at altitudes >2,000 m.

*Specimens examined.*—*Chibchanomys trichotis* (2)-VENEZUELA: Buena Vista, Táchira State (MBUCV I-2795, I-2796). *Neusticomys monticolus* (4)-ECUADOR: Cañón de Río Pita (AMNH 64629); Santa Rosa above Río Pita, 2,928 m (AMNH 64632, 64646); Pichincha, San Ignacio, 3,400 m (AMNH 64625). *N. venezuelae* (4)-VENEZUELA: Serranía de los Pijiguaos, 140 km SW Caicara, Bolívar State (EBRG 11939, 15951, 15964, 15973). *Ichthyomys pittieri* (3)-VENEZUELA: Rancho Grande, Parque Nacional Henri Pittier, Aragua State, 1,100 m (EBRG 4315, 4316; CVULA I-853). *I. hydrobates* (2)-VENEZUELA: Río Potosí, 14 km SE Pregonero, Táchira State, 1,050 m (CVULA I-1636); Río Mocotíes, vía Mérida-Tovar, Mérida State, 780 m (CVULA I-1291).

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