

Deltamys kemp. By Enrique M. González and Ulyses F. J. Pardiñas

Published 26 December 2002 by the American Society of Mammalogists

Deltamys Thomas, 1917

Deltamys Thomas, 1917:98. Type species *Deltamys kemp*.
Akodon Ellerman, 1941:414 (part, not Meyen, 1838). Type species
Akodon boliviensis Meyen.

CONTEXT AND CONTENT. Order Rodentia, superfamily Muroidea, family Muridae, subfamily Sigmodontinae, tribe Akodontini. *Deltamys*, since the original description, was alternatively considered a subgenus of *Akodon* (Cabrera 1961; Ellerman 1941; Honacki et al. 1982; Massoia 1963, 1964; Musser and Carleton 1993; Reig 1978, 1987) or a full genus (Gyldenstolpe 1932; Massoia 1980). Generic status was based on morphologic (Bianchini and Delupi 1994; González and Massoia 1995) and genetic (Castro et al. 1991; Gentile de Fronza et al. 1979, 1981; Smith and Patton 1999) characters. *Deltamys* is monotypic.

Deltamys kemp Thomas, 1917

Kemp's Grass Mouse

Deltamys kemp Thomas, 1917:98. Type locality "Isla Ella, in the delta of the Rio Paraná at the top of the La Plata Estuary." The exact location of "Isla Ella" is not known; the Delta del Paraná is a large area of islands, marshes, and small rivers and creeks of the Paraná River estuary, between the provinces of Buenos Aires and Entre Ríos (about 34°S and 59°W, Argentina). Type specimen (17.6.1.35, adult male) is housed in the Natural History Museum (London).

Akodon kemp Ellerman, 1941:414. Redesignation of *Deltamys kemp*.

CONTEXT AND CONTENT. Context as for genus. *Deltamys kemp* contains 2 subspecies (González and Massoia 1995).

D. k. kemp Thomas, 1917:98, see above.

D. k. langguthi González and Massoia, 1995:3. Type locality "Parque Lecocq, Montevideo (34°47'S and 56°22'W, Uruguay)." Holotype in the Museo Nacional de Historia Natural de Montevideo, number 1452 (adult male).

DIAGNOSIS. *Deltamys kemp* (Fig. 1) is barely distinguishable externally from medium-sized species of *Akodon*. General color of upper parts is darker than in most *Akodon* species. Epidermal scales of tail are more conspicuous than in *Akodon*. Skull (Fig. 2) is narrow and more gracile than in *Akodon* (Thomas 1917), particularly rostrum, anterior region of frontal bones, and zygomatic arches (Gyldenstolpe 1932). A karyological distinction is the absence of the small pair of metacentric chromosomes present in all *Akodon* (Gentile de Fronza et al. 1979, 1981).



FIG. 1. A young *Deltamys kemp* from Laguna Negra, Rocha Department, Uruguay. Photograph by Alejandro Tomicich.

GENERAL CHARACTERS. *Deltamys kemp* is a small sigmodontine, slightly larger than *Mus domesticus*, with a rotund body, relatively large head, and moderately short limbs and tail (Bianchini and Delupi 1994; Massoia 1964). Eyes are small, ears are narrow, and pelage is soft. Dorsum is a sparkling blackish brown in color, and venter is dull brownish gray. Sides are paler than dorsum but without a separation line. Fur is dense and velvety.



FIG. 2. Dorsal, ventral, and lateral views of skull and labial view of mandible of *Deltamys kemp* from La Balandra, Berisso, Buenos Aires Province, Argentina (Instituto de Limnología "R. Ringuelet" Mammal Collection number 256, adult female). Greatest length of skull is 25 mm. Greatest length of mandible is 16 mm. Photographs by Darío Podestá.

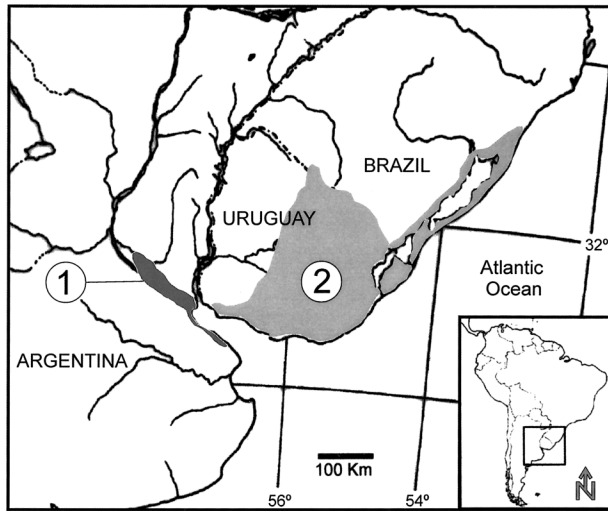


FIG. 3. Geographic distribution of *Deltamys kemp*: 1) *D. k. kemp* and 2) *D. k. langguthi*.

Guard hairs have a black tip and a paler basal zone. Plush hairs are grayish. A detailed color description of Argentinean specimens is available (Massoia 1964). Specimens from Punta Lara (Buenos Aires Province, Argentina) have a white patch on the chin (Bianchini and Delupi 1994) noted by Massoia (1964) in 2 individuals. Pes and manus are dark gray. Eyes are barely visible, without eyerings. Ears are also small, rounded, with delicate black hairs on both sides; they appear semi-hidden among the hair. The tail, only faintly bicolored, is slightly shorter than head and body and is finely haired along its length. Epidermal scales of tail are visible with the naked eye. General descriptions of external appearance, skull, and molars are available (Bianchini and Delupi 1994; Gyldestolpe 1932; Massoia 1964). Mean external measurements (in mm), of 4 females and 2 males, respectively, from Argentina were: total length, 179.1, 185.5; length of tail, 83.4, 85.0; length of ear, 13.5, 12.7; length of foot without claws, 20.4, 21.5 (Massoia 1964). Measurements for 5 females and 5 males from Uruguay were: total length, 185.2, 179.0; length of tail, 82.8, 83.2; length of ear, 13.0, 12.2; length of foot without claws, 21.9, 22.5 (González and Massoia 1995). External measurements (in mm) of the holotypes (*D. k. kemp* and *D. k. langguthi*, respectively) were: total length, 174.0, 191.0; length of tail, 85.0, 90.0; length of ear, 13.0, 14.3; length of foot without claws, 22.0, 21.3 (González and Massoia 1995; Gyldestolpe 1932; Thomas 1917; Yepes 1935).

Means and *SD* of selected cranial and mandibular measurements (in mm) for *D. k. kemp* (Punta Lara, Buenos Aires—Massoia 1964) and *D. k. langguthi* (Parque Lecocq, Montevideo—González and Massoia 1995) respectively, were: greatest length of skull, 25.52 (0.46, $n = 6$), 26.03 (0.60, $n = 11$); zygomatic breadth, 11.96 (0.41, $n = 6$), 12.66 (0.50, $n = 11$); minimum interorbital width, 4.38 (0.14, $n = 6$), 4.21 (0.14, $n = 11$); breadth of braincase, 10.76 (0.25, $n = 6$), 10.90 (0.30, $n = 11$); length of nasal bone, 9.60 (0.40, $n = 6$), 9.40 (0.36, $n = 11$); length of maxillary toothrow, 4.13 (0.13, $n = 6$), 4.06 (0.08, $n = 10$); palatal length, 3.86 (0.13, $n = 6$), 12.65 (0.25, $n = 10$); width of rostrum, 4.31 (0.10, $n = 6$), 3.88 (0.20, $n = 11$); length of mandibular toothrow, 4.16 (0.17, $n = 6$), 4.04 (0.07, $n = 9$); total length of mandible, 12.52 (0.34, $n = 6$), 13.24 (0.22, $n = 9$). Sexual dimorphism is not evident.

DISTRIBUTION. *Deltamys kemp* occurs in a small region of southeastern South America (Fig. 3), ranging from northeast of the Province of Buenos Aires and south of the Province of Entre Ríos in Argentina (Massoia 1964, 1983), throughout Uruguay to the Brazilian state of Rio Grande do Sul. Argentinean populations correspond to *D. k. kemp*, whereas the Uruguayan form is *D. k. langguthi*. In Argentina *D. kemp* is known from the Delta del Paraná area and from several localities bordering the Río de La Plata estuary (Bianchini and Delupi 1993; Massoia 1964; C. Galliari and U. F. J. Pardiñas, in litt.). In Uruguay it occurs in the departments of Colonia, San José, Montevideo, Canelones, Maldonado, Rocha, Lavalleja, Treinta y Tres, Cerro Largo, Durazno, Tacuarembó and

Rivera (González et al. 1995; González and Massoia 1995). Records in Brazil are from Taim, Tapas, and Tramandai (Castro et al. 1991), all in the state of Rio Grande do Sul. Brazilian specimens are tentatively assigned to *D. k. langguthi* (González and Massoia 1995).

FOSSIL RECORD. Several Pleistocene–Holocene sigmodontine remains from Buenos Aires Province are known (Pardiñas 1999a, 1999b), but no *D. kemp* specimen has been found.

The oldest Akodontini are recorded from the lower Chapadmalalan (Middle–Late Pliocene), represented by the genus *Necromys* (Pardiñas and Tonni 1998; Reig 1978). The genus *Akodon* is first recorded in the upper Chapadmalalan (Late Pliocene) from the classic fossiliferous sites on the Atlantic coast of the province of Buenos Aires (Reig 1978, 1987). Molecular data suggest the separation between *Akodon sensu stricto* and other Akodontini occurred ca. 3.5×10^6 years ago (Smith and Patton 1999).

FORM AND FUNCTION. Skull is gracile, relatively long, and narrow (Fig. 2). Foreparts of nasals and premaxillary bones project slightly forward from anterior side of incisors. Premaxilla presents a moderately developed gnathic process. Posterior border of occipital region is flattened, and occipital condyles are inconspicuous from above (Bianchini and Delupi 1994). Zygomatic plate is narrow, with anterior border straight and oblique; inferior region is slightly more forward than upper one. In dorsal view this plate is scarcely visible because either it does not project or has minimal projection. Insertion of anterior part of deep lateral masseter muscle is reduced. Descending hamular process is weak. Periotic capsules are small, and paraoccipital processes are slightly developed. Tympanic bullae are flattened and reduced, and their ventral border does not surpass a line defined by the molar plane projected on the henselion. Basicranial features include well-developed alisphenoid strut, buccinator-masticatory trough, and moderate foramen ovale accessorius. Interorbital region is comparatively wide, with a slightly marked constriction. Interparietal is small. Postdiastemal portion of palate is long and wide (Hershkovitz 1962). Incisive foramina are relatively narrow, with sharp posterior tips ending at level of protocone of M1. Anterior border of mesopterygoid fossa is wider than in *Akodon* and does not extend past the posterior margin of M3.

Dental formula is $i\ 1/1, c\ 0/0, p\ 0/0, m\ 3/3$, total 16. Upper incisors are orthodont and smooth, with a Thomas angle of $83\text{--}87^\circ$, greater than in several species of *Akodon* (Bianchini and Delupi 1994; Thomas 1917). Molars are small, with a typical akodontine occlusal pattern. Molars have a moderately developed tubercular hypsodonty with crowns usually crested, bileveled with wear (sensu Hershkovitz 1962). Pattern of primary cusps is slightly alternate. Teeth wear rapidly and lose their occlusal structures. Anteromedian flexus of M1 is weakly developed. As in M2, anteroloph and mesoloph are present but reduced. M3 is subcylindrical in form.

Mandible is elongated, slender, and low, with masseteric crest barely developed and reaching the middle of m1. Diastema is the same in length as m1 and m2 combined. Symphysis is low, and uppermost anterior point of diastema is almost at a level with mental foramen. Coronoid process is relatively long and projected backward, and condyloid process is elongated. Capsular projection, which lies at the level of the medial part of the sigmoid notch, is weakly developed.

Lower molars are enlarged and simplified, with m1 proportionally and, in some specimens, absolutely shorter than m2; procingulum is wide and short with a shallow anteromedian flexid, distinguishable only in young individuals. The m2 has a weakly developed protoflexid, and m3 is transversely compressed, with a short hypoflexid.

Vertebral formula is 7 C, 13 T, 6 L, 29–30 Ca, total 55–56 ($n = 2$ —Steppan 1995). One female had 4 embryos (Redford and Eisenberg 1992).

ECOLOGY. *Deltamys kemp* inhabits marsh environments, especially edges of wetlands, flood grasslands, and places with reeds and straws, usually without trees. In Parque Lecocq (Montevideo Department, Uruguay) it is common in wetlands and less frequent in woodlands with a high diversity of trees and shrubs (González 1996). In Buenos Aires Province (Argentina), *D. kemp* is recorded in wetlands, tall grass coastal areas (*pajonales*), flooded grasslands, and gallery forests (Bianchini and Delupi 1993, 1994).

In Uruguay *D. kemp* was collected with traps placed on float-

ing vegetation. However, this species has no external adaptations specialized for aquatic life and has no greater swimming ability than other mice of similar size and morphology. The long rostrum, pes and manus morphology, and claw length suggest digging and carnivorous habits (Bianchini and Delupi 1994). Body proportions suggest *D. kemp* is fossorial, with its short tail, long hind claws, and the scapula proportionally long in relation to humerus-ulna length (Miller and Anderson 1977). Captive individuals may dig but usually forage on the ground and look for epigeous resting sites; resting occurs under grasses, leaves, and branches (Massoia 1964).

Insect remains (Coleoptera and Orthoptera) were found in stomachs of 2 Argentinean specimens (Massoia 1964). Stomach contents from 3 individuals from Laguna del Cisne (Canelones Department, Uruguay) had mainly insect remains, little pieces of seeds, and few remains of green plants (E. González, in litt.). Traps may be baited with cold meats.

Three young specimens were found in Quilmes (Buenos Aires Province, Argentina) in a nest made with vegetal fibers placed into a hollow trunk (Massoia 1964). In Uruguay, a nest, containing 3 young, was found in a palm woodland W of Laguna Negra (Rocha Department—E. González, in litt.). The nest was inside a fallen palm (*Syagrus capitata*), with the entrance 30 cm above ground level.

In some Argentinean localities *D. kemp* is very rare (Bianchini and Delupi 1994; Kravetz 1972; Massoia 1964; Thomas 1917). In others and in some places in Uruguay it is relatively common (González 1996; González and Fregueiro 1999; Massoia 1983). *D. kemp* is preyed on by the barn owl (*Tyto alba*) throughout its range. This rodent accounts for ca. 10% of the small mammal prey in the Delta del Paraná (Massoia and Fomes 1964; Massoia et al. 1989). In the Islas de Ibicuy (Entre Ríos Province, Argentina) it was the 3rd most common prey of the barn owl, ca. 20% of 2,367 individuals taken (Massoia 1983). *D. kemp* occurred in barn owl pellets from the Reserva Natural Estricta Otamendi (Campana, Buenos Aires Province, Argentina—Pereira and Massoia 1999) as well as in owl pellets from Bagé (Brazil—González et al. 1999) and Tacuarembó (Uruguay—González et al. 1995). *D. kemp* from Buenos Aires Province, Argentina hosts several ectoparasites (Dermanysoidea and Siphonaptera) including: Acarini, Laelapidae: *Androlaelaps fahrenheitsi*, *A. rotundus*, *Eulaelaps stabularis*; and Tungidae: *Polygenis atopus*, *P. bohlsi*, *P. platensis*, *P. rimatus* (Autino and Lareschi 1998; Lareschi and Mauri 1998).

Rodents recorded in Uruguay in conjunction with *D. kemp* include: *Akodon azarae*, *Holochilus brasiliensis*, *Lundomys molitor*, *Necromys obscurus*, *Oligoryzomys flavescens*, *Oligoryzomys delticola*, *Oxymycterus nasutus*, and *Scapteromys tumidus*. At least *O. flavescens* and *S. tumidus* are strongly associated with the same habitats as *D. kemp*. In Argentina *D. kemp* was trapped with *Bibimys torresi*, *Oxymycterus rufus*, and *Scapteromys aquaticus* (Bianchini and Delupi 1994; Hershkovitz 1966; Massoia 1964).

GENETICS. *Deltamys kemp* has $2n = 35-38$ with $FN = 38$ (Castro et al. 1991). The somatic complement consists of 36 acrocentric chromosomes and 1 odd submetacentric chromosome (Gentile et al. 1981). The sex-chromosome determining mechanism is of the $X_1X_1X_2X_2/X_1X_2Y$ type (Sbalqueiro et al. 1984). Different Robertsonian autosome translocations were recorded for each of the 4 localities for which cytogenetic studies were conducted. Seven different karyotypes due to 2 autosome-centric fusions (2 with 3 and 9 with 15) in homozygous and heterozygous states and Y-autosome translocations are present in all males (Castro et al. 1991). Four autosome-centric fusions are carried by 44% of *D. kemp*, and each rearrangement is restricted to a distinct locality.

CONSERVATION STATUS. In Argentina *D. kemp* is categorized as rare (Reca et al. 1996) and at lower risk (Díaz and Ojeda 2000). Populations are protected at the Reserva Provincial Punta Lara and the Reserva Natural Estricta Otamendi (Buenos Aires Province, Argentina—Heinonen Fortabat and Chebez 1997; Massoia 1964). Uruguayan populations are not considered endangered (González and Soutullo, in press); but *D. k. langguthi* populations are protected at Parque Lecocq (Department of Montevideo—González 1996) and Area Protegida Laguna de Castillos (Department of Rocha—Gambiarotta et al. 1999). The status of Brazilian populations has not been assessed.

REMARKS. Uruguayan specimens designated as “*Akodon obscurus*” by Barlow (1969) correspond to *D. kemp* (Ximénez et al. 1972:24); however, reexamination of the original series is needed to check the validity of Barlow’s observations about Uruguayan populations of *D. kemp* (González and Massoia 1995:5).

The generic name *Deltamys* is derived from the Greek words *delta* in reference to the Delta del Paraná area in Argentina, and *mys*, mouse. The species name *kemp* honors Mr. Robin Kemp, who collected mice for the British Museum in Delta del Paraná. The name of the type locality “Isla Ella” probably reflects a misspelling of the Spanish word *aquella* (those). The Spanish name ratón aterciopelado was proposed by Massoia (1964), and Kemp’s grass mouse by Wilson and Cole (2000).

We thank D. Podestá for the skull and mandible photographs. G. D’Elía and M. Lareschi provided valuable information. Lucy Shirlaw greatly improved the English version of this account. This work was funded by Vida Silvestre, Sociedad Uruguaya para la Conservación de la Naturaleza (E. M. González) and by Consejo Nacional de Investigaciones Científicas y Técnicas and Fundación Antorchas (U. Pardiñas).

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Associate editors of this account were ELAINE ANDERSON and SERGE LARIVIÈRE. Editor was VIRGINIA HAYSSSEN.

ENRIQUE M. GONZÁLEZ, MUSEO NACIONAL DE HISTORIA NATURAL, CASILLA DE CORREOS 399, 11.000 MONTEVIDEO, URUGUAY. ULYES F. J. PARDIÑAS, DEPARTAMENTO CIENTIFICO PALEONTOLOGÍA VERTEBRADOS, MUSEO DE LA PLATA, PASEO DEL BOSQUE S/N, 1900 LA PLATA, ARGENTINA. Present address of Pardiñas: CENTRO NACIONAL PATAGÓNICO, CASILLA DE CORREOS 128, 9120 PUERTO MADRYN, CHUBUT, ARGENTINA.