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Microcavia australis.

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Microcavia Gervais and Ameghino, 1880

Cavia Geoffroy and d'Orbigny, 1833:plate 12. Not *Cavia* Pallas, 1766. Type species *Microcavia australis* Geoffroy and d'Orbigny (1883).
Kerodon Bennett, 1836:190 (part). Not *Kerodon* Cuvier, 1823.
Cerodon Waterhouse, 1848:180. Used as a subgenus of *Cavia*; variant spelling of *Kerodon*; not *Kerodon* Cuvier, 1823.
Anaema Blainville, 1855:26. Incorrect subsequent spelling of *Anoema*; not *Anoema* Cuvier, 1809.
Anoema Burmeister, 1879:272. Used as a subgenus of *Cavia*; not *Anoema* Cuvier, 1809.
Microcavia Gervais and Ameghino, 1880:50. Type species *Microcavia typus* Gervais and Ameghino, 1880 (fossil).
Caviella Osgood, 1915:194. Type species *Cavia australis* Geoffroy and d'Orbigny, 1833, by original designation.
Monticavia Thomas, 1916:303. Type species *Monticavia niata* (Thomas, 1898), by original designation.
Nanocavia Thomas, 1925:419. Type species *Nanocavia shiptoni* Thomas, 1925, by original designation.
Microavia Cabrera, 1954:20. Incorrect subsequent spelling of *Microcavia* Gervais and Ameghino, 1880.

CONTEXT AND CONTENT. Order Rodentia, suborder Hystricognathi, superfamily Cavioidea, family Caviidae, subfamily Caviinae. A key to the 3 extant species of *Microcavia* follows.

1 Incisors orthodont, lateral mandibular fossa deepened anteriorly ..... *Microcavia australis*
Incisors pro-odont, lateral mandibular fossa not deepened anteriorly 2
2 Cranial profile strongly convex, length of auditory bulla >10 mm ..... *Microcavia niata*
Cranial profile not strongly convex, length of auditory bulla <10 mm ..... *Microcavia shiptoni*

Microcavia australis (Geoffroy and d'Orbigny, 1833)

Southern Cavy

C[*avia*]. *australis* Geoffroy and d'Orbigny, 1833:1 [unnumbered text for plate 12]. Type locality "sur les bords du Rio Negro, vers le Quarante-unième degré," restricted to the "Lower Rio Negro, [Río Negro, Argentina]" by Thomas (1929:44).
Kerodon Kingii Bennett, 1836:190. Type locality "apud Portum Desire dictum, ad Patagoniæ littus orientale [Puerto Deseado, Santa Cruz, Argentina]."
Cavia (*Cerodon*) *australis* Waterhouse, 1848:180. Name combination.
Cavia Kingii Waterhouse, 1848:plate 3, figure 2. Name combination.
Anæma aperea Blainville, 1855:26. Name combination; not *aperea* Erxleben, 1777.
Cavia aperea Blainville, 1855:plate 2. Name combination; not *aperea* Erxleben, 1777.
[*Cavia Aperea*] *australis* Fitzinger, 1867:154. Name combination.
[*Cavia* (*Galea*)] *australis* Trouessart, 1881:195. Name combination.
Cavia mænas Thomas, 1898:284. Type locality "Chilecito, [La] Rioja, [Argentina] 1200 metres."
[*Cavia* (*Kerodon*)] *australis* Trouessart, 1897:639. Name combination.
[*Cavia* (*Cerodon*)] *moenas* Trouessart, 1904:527. Name combination; incorrect subsequent spelling of *maenas* Thomas, 1898.
[*Caviella*] *maenas* Thomas, 1916:302. Name combination.
Caviella australis australis Thomas, 1921:445. Name combination.
Caviella australis nigriana Thomas, 1921:446. Type locality "Neuquen, R. Negro," Neuquén, Argentina.
Caviella australis joannia Thomas, 1921:446. Type locality "Cañada Honda, San Juan [Argentina]. Alt. 500 m."
Caviella australis maenas Thomas, 1921:447. Name combination.
Caviella australis salinia Thomas, 1921:447. Type locality "Recreo," Catamarca, Argentina.
[*Microcavia*] *australis* Kraglievich, 1927:579. Name combination.
[*Microcavia*] *moenas* Kraglievich, 1927:579. Name combination; incorrect subsequent spelling of *maenas* Thomas, 1898.
C[*aviella*]. *a*[*ustralis*]. *kingi* Thomas, 1929:44. Name combination.
Microcavia australis australis Yepes, 1935:plate X, figure 3. First use of current name combination.
M[*icrocavia*]. *australis kingii* Yepes, 1935:242. Name combination.
M[*icrocavia*]. *australis joannia* Yepes, 1935:242. Name combination.
M[*icrocavia*]. *australis maenas* Yepes, 1935:242. First use of current name combination.
M[*icrocavia*]. *australis salinia* Yepes, 1935:242. First use of current name combination.
Cavia (*Microcavia*) *australis* Osgood, 1943:142. Name combination.

CONTEXT AND CONTENT. Content as for genus. Three subspecies currently are recognized based on pelage color and cranial morphology (Cabrera 1954).

M. a. australis (Geoffroy and d'Orbigny, 1833:1 [unnumbered text for plate 12]), see above (*kingii* Bennett, 1836, *nigriana* Thomas, 1921, and *joannia* Thomas, 1921:446, are synonyms). If southern populations prove recognizable, *kingii* Bennett, 1836, is the available name.
M. a. maenas (Thomas, 1921:1916), as above.
M. a. salinia (Thomas, 1921:447), as above.

DIAGNOSIS. *Microcavia australis* is distinguished from other members of the Caviinae by the following characteristics: incisors orthodont, pelage grayish yellow with speckled appearance and paler ventrum, and large eyes with surrounding white ring. Adults lack the submandibular gland present in the closely related *Galea musteloides*.

GENERAL CHARACTERS. The southern cavy (Fig. 1) is a medium-size tailless rodent with short, smooth pelage. Dorsum is olive-gray agouti; venter is pale gray. Color of pelage is independent

FIG. 1. *Microcavia australis* from Ñacuñán Reserve, Mendoza Province, Argentina. Photograph by M. F. Tognelli.

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of an adult male *Microcavia australis* from Ñacuñán, Mendoza Province, Argentina (IADIZA collection, Mendoza, Argentina, CM 02475). Greatest length of cranium is 49.0 mm.

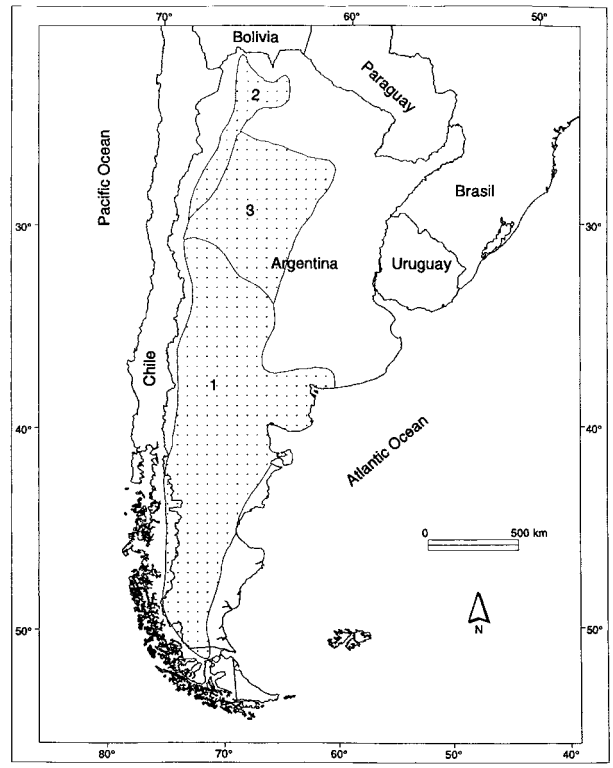

FIG. 3. Geographic distribution of *Microcavia australis* in Argentina and Chile: 1, *M. a. australis*; 2, *M. a. maenas*; 3, *M. a. salinia* (Cabrera 1954; Redford and Eisenberg 1992).

of age, sex, locality, or season (Cabrera 1954). *M. australis* has small rounded ears. Eyes are large and surrounded by a conspicuous white ring.

Mean (range) of external measurements (in mm) of adult cavies of all subspecies from Argentina are as follows: males, total length, 203.5 (170–245), $n = 12$; length of hind foot, 41.9 (35–50), $n = 11$; length of ear, 17.9 (14–20), $n = 12$; females, total length 190.7 (176–220), $n = 4$; length of hind foot, 40.9 (38.8–43), $n = 4$; and length of ear, 17.9 (15–22), $n = 4$ (Cabrera 1954). Adults weigh 200–326 g (Mares et al. 1981; Rood 1970). Mean (range) of length of lower tooth series is 11.08 mm (9.5–12.55 mm), $n = 22$, and mean of length of upper tooth series is 10.87 mm (9.1–12.8 mm), $n = 23$ (Quintana 1996).

Mean external and cranial measurements (in mm; Fig. 2) of the 3 subspecies of *M. australis* from Argentina are as follows: *M. a. australis*, total length 190.1, $n = 10$; length of hind foot, 41.5, $n = 9$; length of ear, 16.7, $n = 10$; length of cranium, 48.0, $n = 8$; basal length, 36.8, $n = 2$; palatal length 19.0, $n = 5$; zygomatic width, 28.3, $n = 5$; interorbital width, 10.5, $n = 8$; braincase width, 21.6, $n = 5$; and length of auditory bullae, 13.1, $n = 6$; *M. a. salinia*, total length, 205.0, $n = 3$; length of hind foot, 37.6, $n = 3$; length of ear 19.3, $n = 3$; length of cranium, 49.0, $n = 6$; basal length, 40.5, $n = 5$; palatal length, 20.8, $n = 5$; zygomatic width, 27.5, $n = 4$; interorbital width, 11.7, $n = 6$; braincase width, 21.4, $n = 5$; and length of auditory bullae, 14.2, $n = 6$; *M. a. maenas*, total length, 228.7, $n = 3$; length of hind foot, 46.0, $n = 3$; length of ear, 20.7, $n = 3$; length of cranium, 50.4, $n = 5$; basal length, 41.2, $n = 3$; palatal length, 20.3, $n = 5$; zygomatic width, 28.3, $n = 5$; interorbital width, 11.0, $n = 6$; braincase width, 22, $n = 3$; and length of auditory bullae, 12.4, $n = 5$ (Cabrera 1954).

DISTRIBUTION. The southern cavy occurs from Jujuy Province, northwestern Argentina, to Santa Cruz Province in the south (Fig. 3). Also, it is found in southern Chile (Osgood 1943) and might occur in southern Bolivia (Anderson 1997; Redford and Eisenberg 1992).

FOSSIL RECORD. The subfamily Caviinae might have originated during the late Miocene (Quintana 1996, 1998). Fossils of the genus *Microcavia* are known from the mid-Pliocene to the Recent in South America (Pascual 1962; Quintana 1996). Three extinct species of the genus *Microcavia* are known: *M. robusta* Gervais and Ameghino, 1880; *M. chapalmalensis* Ameghino, 1908; and *M. reigi* n. nom. (Quintana 1996). Nine other fossil species of *Microcavia* have been proposed: *M. breviplicata* Burmeister, 1865; *M. dubia* Gervais and Ameghino, 1880; *M. intermedia* Gervais and Ameghino, 1880; *M. typica* Gervais and Ameghino, 1880; *M. prona* Ameghino, 1889; *M. pampaea* Ameghino, 1889; *M. uncinata* Ameghino, 1889; *M. isolinense* Castellanos, 1958; and *M. aua* Mones and Castiglioni, 1979. These designations have been assigned based on very fragmentary fossil remains and therefore are considered as nomen nudum (Quintana 1996). Moreover, the occurrence of a great variation in the size and form of the dentition of *Microcavia* (Contreras 1964) has erroneously led to the proposition of different taxonomic entities (Quintana 1996). Landry (1957) suggested that the Caviidae was derived from the Eocardiidae and first appeared in the mid-Miocene, represented by a specialized subfamily, the Cardiomyinae. The ancestors of the Caviinae appear in the Mesopotamian in the late Pliocene, represented by *Paleocavia* (Landry 1957).

FORM AND FUNCTION. Dental formula is i 1/1, c 0/0, pm 1/1, m 3/3, total 20. *Microcavia* is the only genus in the Caviidae in which substitution of molars by premolars does not occur

in fetal life but occurs after the individual is born (Kraglievich 1930). The posterior process of the M3 is well separated from the rest of the tooth by a deep, narrow, enamel fold (Kraglievich 1930). *M. australis* has large auditory bullae, the maximum diameter of which is greater than one-third the zygomatic width (Fig. 2; Kraglievich 1930).

Females have 4 mammae (Rood 1972). In males, testes usually remain scrotal throughout life, although males with nonscrotal testes have been captured (Rood 1972).

Mean (± *SE*) of mass (in g) of several organs of *M. australis* are as follows: heart, 1.28 ± 0.21; lungs, 2.92 ± 0.51; liver, 9.86 ± 1.39; kidneys, 3.14 ± 0.51; gastrointestinal tract, 74.85 ± 5.57 (Herre et al. 1996). Deviations from the mammal line (mouse–elephant line), expressed in percentage of the organ masses of *M. australis* relative to body mass, are as follows: heart, −2.39; liver, −0.38; lungs, +18.89; kidneys, +46.87 (Herre et al. 1996).

ONTOGENY AND REPRODUCTION. In Buenos Aires Province, Argentina, reproduction occurs from August to April; most litters are born between September and October (Rood 1970). In captivity, the mean (± *SE*) gestation period was 54.2 ± 0.4 days (range, 53–55 days), $n = 6$ (Rood 1970). Young born after gestation periods of 51 and 52 days appeared premature and died soon after parturition (Rood 1972). The mean (± *SE*) litter size of 16 litters was 2.8 ± 0.3 (range, 1–5—Rood 1972). Young *M. australis* are able to run about soon after birth and commonly are weaned at ca. 3 weeks (Rood 1972). Means (range) and sample sizes for total length (in mm) and mass (in g) of neonates from Buenos Aires Province, Argentina (Rood 1972), are as follows: males, total length, 94.5 (81–104), 17; mass, 29.9 (17–44), 17; females, total length, 97.1 (88–116), 16; mass, 30.9 (24–39), 16.

Females usually come into estrus and mate when 40–50 days old, but they may not conceive at this time (Rood 1970). Estrous cycle length may be 15 days; a captive female came into estrus and mated 15 days after giving birth (Rood 1972).

ECOLOGY. *Microcavia australis* inhabits arid and semiarid lowlands and valleys. In southwestern Argentina, it prefers riparian habitats, forested areas, or sandy forested flats (Redford and Eisenberg 1992). In Buenos Aires Province, Argentina, southern cavies inhabit areas where thornbushes (*Schinus fasciculatus, Condalia microphylla*) are the predominant vegetation, and they are able to live in the absence of ground vegetation cover (Rood 1970). In the Monte Desert of Mendoza Province, Argentina, the burrow systems of *M. australis* were associated with plants with low branches (Ojeda and Mares 1989; Tognelli et al. 1995) and with the plant species *Condalia microphylla* (Tognelli et al. 1995). Colonies in the Monte Desert range from 4 to 38 individuals/burrow system (Contreras and Roig 1978). Excavation of 1 burrow system after removal of its 38 occupants revealed 26 surface entrances, total length of 42 m, mean diameter of 8 cm, and mean depth of ca. 20 cm (Contreras and Roig 1978). In Buenos Aires Province, density of southern cavies was 24.4 animals/ha in April (Rood 1970). In the same area, similar numbers of males and females were found in autumn and winter, but about twice as many males as females were present in spring (Rood 1970).

Adult males have home ranges of ca. 0.75 ha (7,720 m^2 ± 1,160 *SD*, $n = 5$), twice the size of home ranges of females (3,525 ± 382 m^2, $n = 3$). Mean and maximum observed range length for adult males were 128.4 m and 142 m, respectively. For adult females these values were 80 m and 90 m, respectively (Rood 1970). Home ranges of both males and females overlap and may coincide with those of other individuals of the same sex (Rood 1972).

Southern cavies feed on leaves, shoots, fruits, and flowers (Rood 1970). In the Monte Desert of Mendoza Province, Argentina, mesquite (*Prosopis flexuosa*) and atamisque (*Capparis atamisquea*) were the most frequent plants in the diet of cavies (Monge et al. 1994). *M. australis* can climb trees or shrubs up to 4 m height to forage on the leaves (Mares et al. 1977; Rood 1970). In the Monte Desert, during extremely dry periods, cavies may gnaw the bark of trees and shrubs such as chañar (*Geoffroea decorticans*) and creosote bush (*Larrea divaricata*). This predation may affect the survival and distribution of these plants (Borruel et al. 1998; Tognelli et al. 1999).

In the Monte Desert, burrowing owls (*Athene cunicularia*) and red-back hawks (*Buteo polyosoma*) fed on cavies (R. Ojeda, E. Pescetti, and S. Monge, in litt.). The grison (*Galictis cuja*) was reported as the main predator of cavies in the province of Buenos Aires (Rood 1972); gray foxes (*Pseudalopex gymnocercus*) and skunks (*Conepatus castaneus*) may also prey on cavies (Rood 1972).

Pneumonic plague affects *M. australis* populations in the Monte Desert (de la Barrera 1940). The disease is caused by a virus and is transmitted by the flea *Polygenis platensis cisandinus* (order Siphonaptera). *M. australis* hosted the following fleas: *Hectopsylla gemina, H. coniger, H. stomis, Pulex irritans, Parapsyllus barrerai, P. galeanus, P. talis, P. andricus, Parapsyllus, Tiamastus,* and *Phthiropsylla agenoris* (de la Barrera 1940). Seven species of ectoparasites in southern cavies from Buenos Aires Province included 5 fleas from the list of de la Barrera (1940) and 2 taxa, *Ornithonyssus bacoti* and *Amblyoma,* from the order Acarina (Rood 1972).

Transfer of ectoparasites, such as the flea that transmits pneumonic plague, appears to be favored by cavy social behavior and population structure (de la Barrera 1940) because groups of several individuals inhabiting the same burrow system will be affected. When dead southern cavies were seen outside of burrow systems, excavations of the galleries revealed more dead animals in the interior (de la Barrera 1940).

BEHAVIOR. Cavies are diurnal and active all year. They emerge from their burrows at sunrise and are active until dusk. However, temperatures over 35°C inhibit activity (Rood 1972). During summer, they forage primarily in mornings and afternoons, avoiding the heat by either sitting in the shade of trees or staying within burrow systems (Mares et al. 1977). Southern cavies dig with several strokes of their forefeet and the soil is kicked backwards with the hind legs (Rood 1970).

Interactions between adult male southern cavies are typically agonistic, which results in a straight-line dominance hierarchy (Rood 1972). Females are less aggressive than males and may form contactual relationships with other females occupying their home bush (Rood 1972). Aggression is the principal intraspecific interaction and aids in reducing density by promoting dispersal (Rood 1970). Colonies are structured around a male dominance hierarchy; however, because mortality is high, individual males in the hierarchy are constantly changing (Rood 1970). Adult males have amicable interactions with young males ≥6 weeks of age, after which time the adults begin to respond aggressively (Rood 1972). The paucity of shelter sites may contribute to low levels of aggression in *Microcavia,* particularly among females (Lacher 1981).

Cooperation in *M. australis* is common. In severe weather, they may huddle together to conserve body heat, and they practice mutual grooming (Rood 1970). Indiscriminate nursing has been observed commonly both in wild and captive animals (Rood 1972).

Regarding evolution of behavior in the Caviidae, *Microcavia* is considered to be the most similar to the caviine ancestor (Lacher 1981; Rood 1972). Rood (1972) suggested a trend toward increasing behavioral complexity among Argentine cavies, with *Microcavia* having the least complex behavioral interactions and *Cavia* having the most complex. *Microcavia* has a relatively high social tolerance, amicable relationship among females, simplified sexual and reproductive repertoires, and inhabits open thornbush formations (Lacher 1981).

Southern cavy colonies have a strong fidelity to their burrow systems (Contreras and Roig 1978). When in danger, cavies run away, sometimes passing many burrow entrances before entering their own burrow system (Contreras and Roig 1978).

At least 3 vocalizations are known (Rood 1972). One is a low-pitch alarm call to alert nearby animals in response to the approach of humans or possible predators; it can be emitted singly or in series of 1 call about every 3 s. Another type of call is a series of barely audible squeaks that may express arousal or annoyance and are emitted during a chase or courtship. The 3rd type, a high-pitch note sometimes repeated several times, expresses extreme fear (Rood 1972).

REMARKS. Additional vernacular epithets for this species include cuis, cuis chico, cuy, conejo del cerco, cuye (Chile), small cavy, and wild Guinea pig. The etymology of the genus name *Microcavia,* 'small cavy,' is in reference to the similarity of these animals to members of the genus *Cavia,* although members of *Microcavia* are smaller (Braun and Mares 1995; Palmer 1904). The specific epithet, *australis,* meaning 'southern,' is in reference to the general region of the type locality, Patagonia, in the southern part of South America (Braun and Mares 1995).

In their original description of the genus *Microcavia,* Gervais and Ameghino (1880) did not designate the type species. Kraglievich (1930) proposed *M. australis* Geoffroy and d'Orbigny (1833)

as the type species. In his review of the family Caviidae, Cabrera (1954) argued that the type species should be the extinct *M. typus* Gervais and Ameghino (1880).

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