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Abrothrix xanthorhinus.

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Abrothrix Waterhouse, 1837

Abrothrix Waterhouse, 1837:21 (subgenus; as a genus by Gray, 1843). Type species *Mus* (*Abrothrix*) *longipilis* Waterhouse, by original designation.

CONTEXT AND CONTENT. Order Rodentia, Suborder Sciurognathi, Family Muridae, Subfamily Sigmodontinae, Tribe Akodontini, Genus *Abrothrix,* which we regard as including eight extant species based on the collective results and comments of Gardner and Patton (1976), Reig (1987), and Smith and Patton (1993). Patterson et al. (1984) specifically rejected assignment of *xanthorhinus* to *Abrothrix,* retaining it and the closely related species *hershkovitzi* in *Akodon.* Reig (1987) and Musser and Carleton (1993) considered *Abrothrix* as a subgenus of *Akodon.* Spotorno (1992) argued for generic status for *Abrothrix* based on a morphological study, as did Smith and Patton (1993) based on molecular data. Given the uncertainty of relationships and classification of species assignable to either *Akodon* or *Abrothrix,* we are not presenting herein a key to their identification. The species we tentatively consider to comprise the genus *Abrothrix* are: *andinus, hershkovitzi, illutea, lanosus, longipilis, olivaceus, sanborni,* and *xanthorhinus. Akodon markhami* described by Pine (1973:423) is generally regarded to be most closely related to *olivaceus* and, if worthy of recognition at any taxonomic level, almost certainly will be included eventually in the same genus as *olivaceus.* Similarly, de Santis and Justo (1980:121) named *Akodon* (*Abrothrix*) *mansoensis,* which Smith and Patton (1993) included in the genus *Abrothrix.* Monjeau et al. (1994) considered *mansoensis* a synonym of *olivaceus.*

Abrothrix xanthorhinus (Waterhouse, 1837)

Ratón de Hocico Bayo (Yellow-nosed Mouse)

Mus xanthorhinus Waterhouse, 1837:17. Type locality "Hardy Peninsula, Tierra del Fuego" [actually the southeastern extension of Isla Hoste, ca. 55°30'S, 68°W], Magallanes Province, Region XII, Chile (see Patterson et al., 1984:11).

Mus canescens Waterhouse, 1837:17. Type locality Puerto Deseado, Santa Cruz Province, Argentina (not Santa Cruz, Santa Cruz Province, as given by Patterson et al., 1984. Allen [1905:73] described problems with assignment of the type specimens of both *canescens* and *xanthorhinus,* and clarified the type locality of the former as "Port Desire.").

Abrothrix xanthorhinus Gardner and Patton, 1976:28. First use of name combination, but see also Bianchi et al., 1971:728.

Akodon llanoi Pine, 1976:63. Type locality Bahía Capitán Canepa (54°51'S, 64°27'W), Isla de los Estados, Tierra del Fuego, Argentina. A synonym of *A. x. xanthorhinus* according to Patterson et al., 1984:12.

CONTEXT AND CONTENT. Context is as presented for the genus. Relatively complete synonymies of the two recognized subspecies are presented by Patterson et al. (1984). *A. hershkovitzi* might eventually prove to be only an insular subspecies of *A. xanthorhinus.* Finally, *A. xanthorhinus* may eventually be considered conspecific with *A. olivaceus,* as suggested by Yañez et al. (1979: 202). Recognized subspecies are:

A. x. xanthorhinus (Waterhouse, 1837). See above. Includes *A. llanoi* Pine, 1976, as a synonym.

A. x. canescens (Waterhouse, 1837). See above. As arranged by Osgood (1943:180).

DIAGNOSIS. *Abrothrix xanthorhinus* (Fig. 1) is most similar in size to *A. olivaceus,* but is slightly smaller, is obviously lighter colored, and has rusty-orange in the fur compared to the darker gray coloration of *olivaceus.* Cranial measurements of *A. xanthorhinus* (Fig. 2) average slightly smaller than those of *A. olivaceus* (e.g., greatest length of skull, 23.86 versus 25.72; zygomatic breadth, 12.07 versus 12.48—Kelt, 1994). The fur of *A. xanthorhinus* is noticeably shorter than that of *A. longipilis* and *A. sanborni,* two appreciably larger and generally darker congeners.

Abrothrix hershkovitzi is known only from Isla Capitán Aracena and the Cape Horn Islands, Chile. The species was described (Patterson et al., 1984) as being most like *A. xanthorhinus,* differing from it in being larger (>30 g), having a longer tail (>65% head and body length), longer skull (condylobasal length >23.5 mm), longer rostrum with more trumpeted nasals, and maxillary diastema >6.5 mm.

Abrothrix xanthorhinus is narrowly sympatric with *Akodon iniscatus.* The two are quite similar and identifications of them have been confused (see discussion by Patterson et al., 1984). Skulls of *A. xanthorhinus* differ from those of *A. iniscatus* as follows: anterior surface of the first molar is rarely notched (usually notched in *A. iniscatus*), cranium is flatter in dorsal profile, nasals are more elongated, zygomatic plate is narrower, and the interorbital region is dorsally flatter and more rounded at the orbital margins. Skins of *A. xanthorhinus* have longer ears (>13 mm), the tail is tricolored rather than bicolored, and the rusty-orange coloration of nose and tail is prominent. Where they occur in sympatry in southern Patagonia (Lago Fagnano, Argentina, and Punta Arenas, Chile), *A. xanthorhinus* differs on average from *A. lanosus* in being slightly smaller with longer ears, but the white feet of *A. lanosus* provide an unequivocal means of distinguishing the two.

GENERAL CHARACTERS. *Abrothrix xanthorhinus* is a mouse of small size (adults commonly 15–20 g) and is light brown dorsally with characteristic rusty orange on the snout, top of the legs, and sides of the tail. The tail is much shorter (<65%) than the combined length of head and body. Pearson (1995) provided the following list of characteristics: the skull is flat in dorsal profile, the frontal region is inflated, and the rostrum is long with slightly upturned nasals. Width of mesopterygoid fossa is greater than that of parapterygoid fossa. The incisive foramina are rounded posteriorly and reach only to the front of the first molar. The frontal sur-

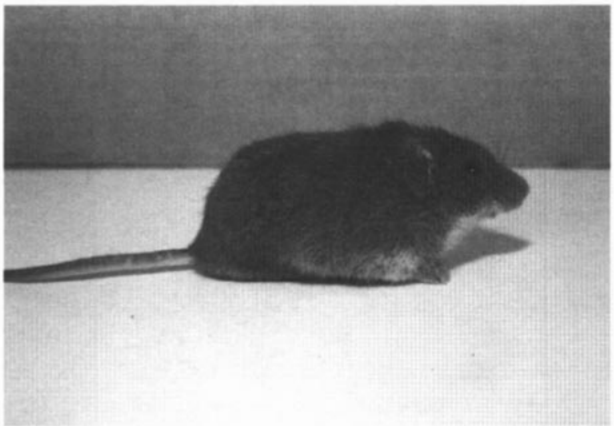

FIG. 1. Adult *Abrothrix xanthorhinus* from near Chile Chico, Chile.

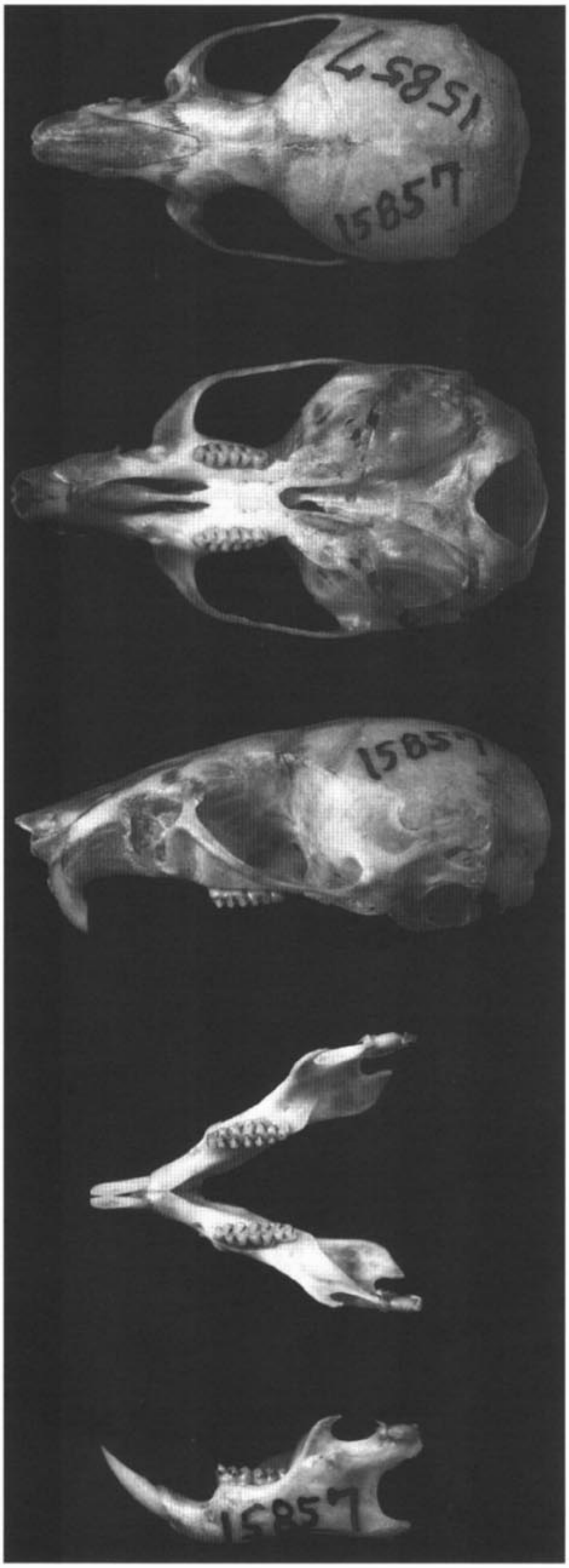

FIG. 2. Dorsal, ventral, and lateral views of the skull, and dorsal and lateral views of the mandible of *Abrothrix xanthorhinus* from Río Negro Province, Argentina (female, Bell Museum of Natural History, #15857). Greatest length of skull is 23.0 mm.

faces of the upper incisors lack longitudinal grooves. The upper molar toothrows do not converge.

Of the two recognized subspecies, *A. x. xanthorhinus* tends to be larger and brownish suffused with rufus, whereas *A. x. canescens* is more grayish brown and generally smaller. Sexual dimorphism in color and size has not been demonstrated for either subspecies, and appears to be lacking, although means of head and body length of females generally were larger than those of males in the small samples from several southern Patagonian localities reported by Patterson et al. (1984). Comparisons of a large sample (166 females and 194 males, respectively) of *A. x. canescens* from near Bariloche, Río Negro, Argentina, by Heinemann (1994) failed to detect significant sexual dimorphism in the following measurements ($\bar{X}$ ± SD): length of head and body, 81.96 ± 7.59, 80.72 ± 5.15; length of tail, 54.72 ± 6.00, 54.84 ± 5.06; length of hind feet, 19.31 ± 1.11, 19.68 ± 1.12; and length of ear, 11.35 ± 0.84, 11.97 ± 1.08. Additionally, Heinemann et al. (1995) measured body masses of these specimens, and reported no significant dimorphism between reproductive males ($\bar{X}$ = 17.8 g; n = 30) and reproductive females ($\bar{X}$ = 16.3 g; n = 44).

In a study of geographic variation of *A. xanthorhinus* in Tierra del Fuego, where both subspecies occur, it was observed that *A. xanthorhinus* tends to be slightly larger than *A. x. canescens* in most dimensions (Patterson et al., 1984). Means of external and cranial measurements (in mm) of female (n = 22) and male (n = 37) *A. x. xanthorhinus* and female (n = 16) and male (n = 15) *A. x. canescens* from Tierra del Fuego, respectively, are: length of head and body, 104.8, 100.1, 103.7, 96.7; length of tail, 56.2, 57.3, 54.5, 54.3; length of hind foot, 21.5, 21.8, 20.6, 21.1; condylobasal length, 22.6, 23.0, 22.2, 22.2; basilar length, 18.9, 19.4, 18.5, 18.7; palatal length, 9.9, 10.1, 9.7, 9.8; length of incisive foramina, 5.5, 5.7, 5.4, 5.4; zygomatic breath, 12.6, 12.7, 12.4, 12.5; cranial depth, 9.6, 9.6, 9.4, 9.3; interorbital breath, 4.1, 4.1, 4.0, 4.0; length of maxillary toothrow, 3.5, 3.6, 3.5, 3.5; and length of maxillary diastema, 6.2, 6.4, 6.1, 6.2. Additional cranial measurements (in mm; $\bar{X}$ ± SD) reported by Kelt (1994) for 24 specimens (male and female combined) from Aisén, Chile, are: greatest length of skull, 23.86 ± 0.65; length of nasals, 9.04 ± 0.39; breath of rostrum, 3.66 ± 0.17; breadth of braincase, 11.42 ± 0.22; width of incisors (measured at the alveolus), 2.38 ± 0.62; interorbital breadth, 7.25 ± 0.20; length of mandibular diastema, 2.31 ± 0.13; length of mandibular toothrow, 3.58 ± 0.14; greatest length of mandible, 11.67 ± 0.34; mandibular depth, 3.38 ± 0.19; and length of coronoid process, 1.10 ± 0.20.

DISTRIBUTION. *Abrothrix xanthorhinus* is one of the southernmost land mammals in the world, occurring in Patagonian steppe and forests of Argentina and Chile from approximately 38°S southward to nearly 56°S in southern Tierra del Fuego (Fig. 3). [Because the most recently published distribution map for this species (Redford and Eisenberg, 1992) includes few records and thus fails to define the northern boundary of distribution, we have included not only published records but also those listed as holdings of several museum collections in Argentina, Chile, and the USA—see Monjeau et al. (1994).] The northern limits of distribution in Argentina follow closely the northern limits of the Patagonian Botanical Province (Cabrera, 1978; Soriano, 1983), which extend farther north on the west and reach the Atlantic coast just south of Península Valdés, Chubut, at approximately 43°S. In the more recent classification of del Valle et al. (1995), the northern limit of the species corresponds to the northern limit of the Central Hills and Mesas Macrobiozone where it meets the Patagonian Monte Macrobiozone, both of which are part of the Extra-Andean Oriental Megabiozone. In Chile, *A. xanthorhinus* is found from approximately 45°S to Tierra del Fuego (Reise and Venegas, 1974), reaching the southernmost known locality of record on Hoste Island (Patterson et al., 1984).

FOSSIL RECORD. Fossils assignable specifically to *A. xanthorhinus* have not been reported. The oldest known fossil assignable to the Tribe Akodontini (*Bolomys bonapartei*) is from Early Pliocene (Montehermosan) deposits in southeastern Buenos Aires Province, Argentina (Reig, 1978). The oldest specimens assignable to the genus *Abrothrix* are those of *A. kermacki*, obtained from the Chapaldmalal Formation, Late Pliocene-Early Pleistocene, near the present city of Mar del Plata, Buenos Aires Province. This fossil more closely resembles the contemporary form of *A. longipilis* than

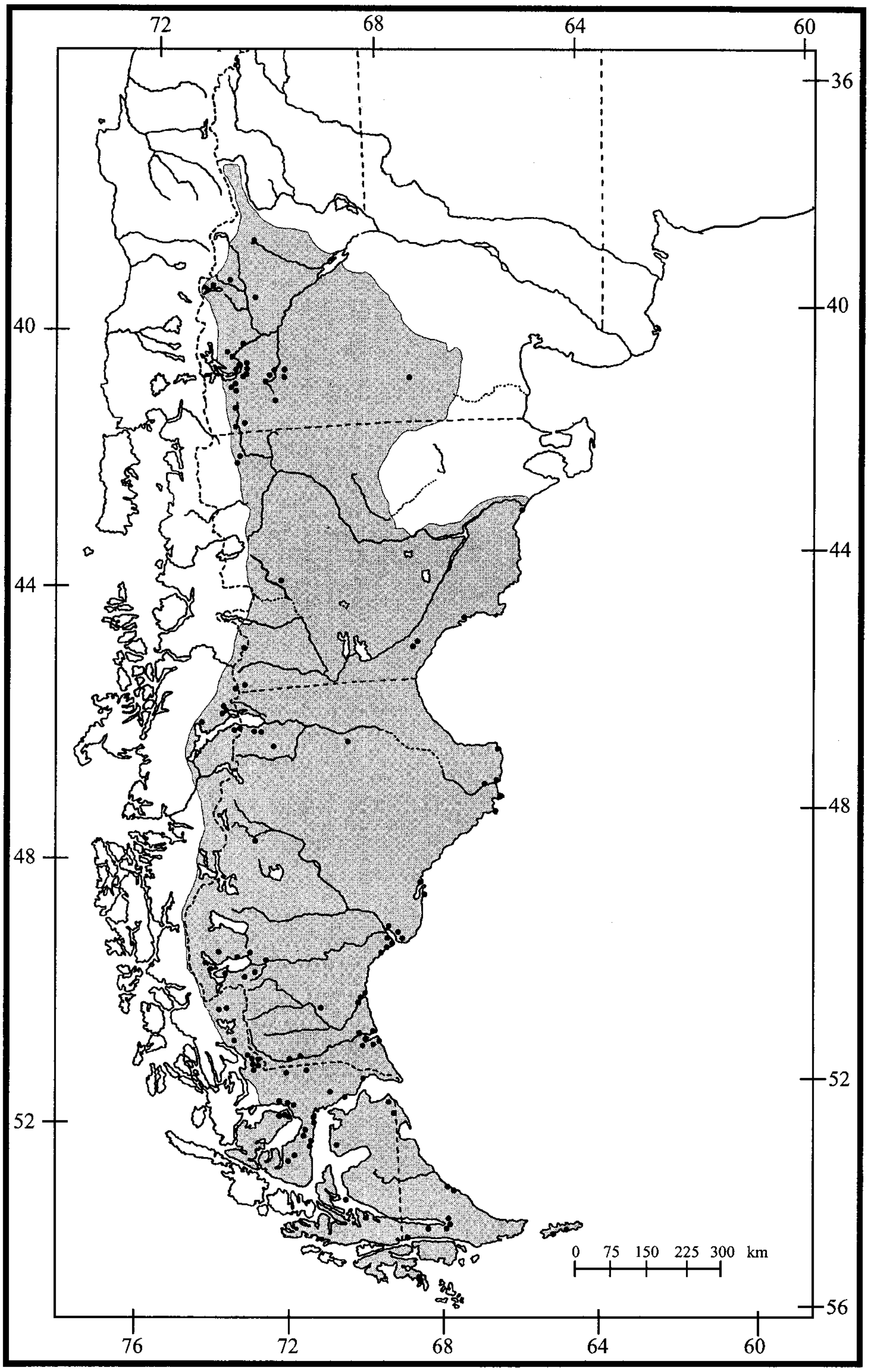

FIG. 3. Distribution of *Abrothrix xanthorhinus.* Dots represent museum specimens for which requested data were forthcoming (see Remarks) as well as all published records of occurrence known to us. Shading represents the predicted distribution of *Abrothrix xanthorhinus* based on plotted records and limits of biozones described by del Valle et al. (1995).

that of either *A. xanthorhinus* or *A. hershkovitzi,* and is larger even than modern *A. longipilis. A. magnus* is known from Early Pleistocene (Vorohuean) deposits from near Mar del Plata (Reig, 1987).

Today the genus *Abrothrix* is distributed primarily in the southern Andean and Patagonian regions from Mendoza to Tierra del Fuego, although *A. andinus* reaches southern Perú. This area is roughly 1,000 km west and south of the localities of known Pliocene and Pleistocene fossils, suggesting either a major range shift or a significant reduction in the distribution of the genus, or both. Reig (1987) suggested that perhaps this change was caused by climatic changes during and since the Pleistocene.

FORM AND FUNCTION. The dental formula of *A. xanthorhinus* is i 1/1, c 0/0, p 0/0, m 3/3, total 16. Pearson (1995) reported the number of molar roots as 4 (M1), 3 (M2), 3 (M3), 2 or 3 (ml), 3 (m2), and 2 (m3), and noted that M3 is slightly smaller than M2.

Molt patterns of *A. xanthorhinus* (82 males and 80 females) in southern Tierra del Fuego were studied by Marconi and Kravetz (1991). Juvenile molt begins on the venter, proceeds laterally to the dorsum, and concludes at the head. Three adult molting types were described: regular or massive, when the pigmented area covered from 20 to 40% of the skin; irregular, observed in 22% of adults, in which hair replacement involves large areas but lacks symmetry and appears to be associated with advanced age; and diffuse, characterized by speckled distribution of melanin deposits (also without symmetry) covering no more than 5% of the total surface of the skin. Adults undergoing regular molt show a symmetrical pattern commencing on the dorsum and progressing ventrally and anteriorly, terminating in the head and neck region with formation of a "necklace." Regular and irregular molts are observed in spring and autumn whereas diffuse molt most commonly occurs during other times of the year, especially winter and mid-summer. The diffuse molt pattern is associated with reproductive activity; all non-breeding adults show regular or irregular molt whereas most breeding adults manifest a diffuse molt.

Differences in the glans penis and baculum between *Abrothrix* and *Akodon* were described by Spotorno (1986, 1992) and Spotorno et al. (1990). In some *Abrothrix*, including both *A. olivaceus* and *A. xanthorhinus*, the phallus and proximal baculum are elongated and the distal baculum is reduced compared to the barrel-shaped phallus and large (nearly one third of total bacular length) distal baculum in *Akodon subfuscus*. In the extreme case (*Abrothrix longipilis* and *A. sanborni*), the phallus and proximal baculum are extremely elongated and the distal baculum is absent.

ONTOGENY AND REPRODUCTION. The annual reproductive period of *A. xanthorhinus* lasts from 7 to 8 months during spring and summer (Heinemann et al., 1995). Marconi (1988) and Heinemann (1994) reported that 100% of over-wintering individuals were sexually active in spring (September–October). Body mass of reproductive individuals exceeded 12 g. Females produced at least two litters per season. Mean lengths recorded for testes and seminal vesicles were 10.3 and 11.7 mm, respectively, for 32 reproductively active males. Juveniles were captured first in October and represented 29% of the population in March when they reached their peak abundance (Heinemann, 1994). Mean numbers of embryos per female were reported as 5.0 (Heinemann, 1994) and 5.5 (Marconi, 1988).

ECOLOGY AND BEHAVIOR. *Abrothrix xanthorhinus* occupies habitats ranging from the cold, humid forested region of southernmost Patagonia (Marconi, 1988; Patterson et al., 1984) to the open, semi-arid steppes in eastern and northern Patagonia (Monjeau, 1989; Pearson and Pearson, 1982). Freezing temperatures are common on winter nights over most of the range and not rare even on summer nights in more southerly areas. Snow sometimes covers the ground for several days in northern areas and for longer periods in the southern part of the range. The snow cover in southern Patagonia is relatively unstable compared to that in similar northern hemisphere latitudes owing to the narrow landmass and strong maritime influence from both the Pacific and Atlantic. Snow cover can melt suddenly during mid-winter causing severe flooding followed by extreme cold resulting in frozen, water-logged soils that provide little or no protection for mice (Marconi and Kravetz, 1991). Marconi (1988) demonstrated that these conditions result in high mortality, and Marconi and Kravetz (1991) reported a positive relationship between survivorship of *A. xanthorhinus* and duration of snow cover in this region.

Habitats used by *A. xanthorhinus* in the northern portions of the range are restricted to arid environments devoid of trees, but the species is not found in the Monte desert, which is warmer with higher rates of evapotranspiration than the Patagonian steppe (Soriano, 1983). South of approximately 45°S the species can be found in both steppe and forest, but it was not captured during extensive trapping (>90 traplines—each set for an average of approximately 100 trapnights) in the southern beech (*Nothofagus*) temperate forests farther north in Neuquen, Río Negro, and northern Chubut (Christie et al., 1983; Monjeau, 1989; Pearson and Pearson, 1982). Where *A. xanthorhinus* does occur in the forest, the bamboo (*Chusquea coleou*) understory characteristic of more northerly forests is absent. In general, *A. x. xanthorhinus* is found in the southernmost forests with *Nothofagus* and *Drimys* (canelo), whereas *A. x. canescens* occurs in steppe habitats (Mann, 1978; Osgood, 1943; Patterson et al., 1984; Pine et al., 1978, 1979; Reise and Venegas, 1974).

In Tierra del Fuego, *A. xanthorhinus* makes use of all available terrestrial habitats (Marconi and Kravetz, 1991). Osgood (1943), Patterson et al. (1984), and Marconi (1988) noted the numerical dominance of *A. x. xanthorhinus* within the mammalian communities of this region. In small mammal communities in the Nahuel Huapi National Park, Río Negro and Neuquen provinces, Argentina, and adjacent areas of northwestern Patagonia, *A. xanthorhinus* was numerically dominant only in bunch grass and bushy steppe, two habitats occupied also by *Eligmodontia morgani* and *Reithrodon auritus* (Monjeau, 1989). *A. xanthorhinus* occurs also in shrubby steppe (captured in 96.4% of 56 traplines), bunchgrass steppe habitats (76.9% of 13 traplines), shrubs (17.5% of 63 traplines), stony steppe (16.6% of 6 traplines), rocky habitats (12.5% of 24 traplines), and meadows in steppe (5.55% of 18 traplines). If meadows surrounded by steppe are disturbed by overgrazing, then *A. xanthorhinus* can invade in the absence of the two species that dominate ungrazed meadows, *A. longipilis* and *Loxodontomys micropus*. However, *A. xanthorhinus* seems unable to invade meadows in forest habitat at this latitude (none in 11 traplines). A significant positive relationship between the trap success of *A. xanthorhinus* and the abundance of herbaceous cover and spiny shrub cover also was demonstrated. Finally, Monjeau (1989) found that in this forest-steppe ecotone *A. xanthorhinus* showed a relatively low measure of habitat breadth as compared to 12 species of small forest and steppe mammals.

Abrothrix xanthorhinus is omnivorous, including insects, seeds, and grasses in its diet (Marconi and Kravetz, 1991; Monjeau, 1989). Individuals kept in captivity (N. Guthmann, pers. obs.), including lactating females, fed only apple and sunflower seeds for extended periods appear to remain in good health. Both intact sunflower seeds and husked kernels were cached routinely. Burrowing behavior was not observed for captive *A. xanthorhinus*, although it is commonly observed in captive *A. longipilis*. Cannibalism was observed on occasion, including among adults trapped together in Sherman traps and occasionally of litters in the laboratory (N. Guthmann, pers. obs.).

Abrothrix xanthorhinus has been trapped syntopically with other closely related Akodontini, including *A. longipilis* in the Nahuel Huapi area of Argentina (Monjeau, 1989) and with *A. olivaceus* near Coihaique Alto in the Aisén Region of Chile (Kelt, 1994). Patterson et al. (1984) earlier reported the latter species pair in sympatry near the Río Nireguao and Río Aisén in southern Chile. *A. xanthorhinus* and *Akodon iniscatus*, morphologically and ecologically similar species of the Patagonian and Monte vegetative regions, respectively, are known to occur in sympatry within a narrow zone that includes Meseta de Somuncura, in Río Negro Province (Bell Museum #15860, *A. xanthorhinus*; #15809, *A. iniscatus*), and Rawson, El Maitén, Pico Salamanca, Lago Blanco, and Cholila, in Chubut Province, Argentina (Patterson et al., 1984).

Density peaks of *A. xanthorhinus* in a steppe habitat in Río Negro, Argentina (41°S), were consistently observed in March during 4 consecutive years, with lows each September (Heinemann, 1994). The maximum individual longevity reported was 12 months, which was observed for both males and females. The maximum density in Heinemann's study was 40 individuals/ha; that reported by Marconi (1988) for a population in Tierra del Fuego was 63.

No significant differences were detected by Heinemann et al. (1995) for average home range sizes of males ($n = 39$, $\bar{X} = 598$ m^2) and females ($n = 28$, $\bar{X} = 548$ m^2) during the non-reproductive season. Males in reproductive condition showed significantly larger home range sizes ($n = 30$, $\bar{X} = 1307$ m^2), but reproductive females ($n = 44$, $\bar{X} = 610$ m^2) showed no significant difference when compared to the pooled samples of males and females from the non-reproductive season. Little overlap was detected between female home ranges during any season, but home ranges of adult males broadly overlapped those of females and other males, suggesting a promiscuous mating system for this population.

Fewer females than males have been reported in unconfined populations of *A. xanthorhinus*. Proportions of females captured were 43% in northern Patagonia (Heinemann, 1994); 46% (Marconi, 1988) and 42% (Patterson et al., 1984) for separate studies in Tierra del Fuego; and 37% in the Aisén Region of Chile (Kelt, 1994). However, when graphs of only reproductive individuals during the breeding season are compared in the reports by Heinemann

(1994) and Kelt (1994), the number of females in both studies is greater than that of males, as would be predicted for a species with promiscuous mating.

No published reports of predation on *A. xanthorhinus* are available. However, A. Trejo (pers. comm.) found remains of this mouse in pellets from the great owl horned (*Bubo virginianus*). Remains also have been discovered in pellets of the barn owl (*Tyto alba*) and in feces of the Colorado fox (*Pseudalopex culpaeus*), all from near Bariloche, northern Patagonia (Monjeau, unpubl.).

The only parasite reported from *A. xanthorhinus* is the louse, *Hoplopleura andina* (Castro, 1981, 1982). Reig (1987) reported this parasite from several other species of the "Andean clade" (Smith and Patton, 1993) of akodontine rodents, including *A. longipilis, A. olivaceus, A. sanborni, Chroeomys jelskii,* and *Chelemys macronyx.* Both Reig (1987) and Smith and Patton (1993) interpreted this taxonomic distribution of louse parasitism as persistence of an early host-parasite relationship among hosts sharing a common ancestry.

GENETICS. The karyotype of *Abrothrix xanthorhinus* (Bianchi et al., 1971; Gallardo, 1982; Patterson et al., 1984; Spotorno, 1986; Spotorno et al., 1990) is similar in many respects to that of *A. longipilis* (the type species of *Abrothrix*). All authors report the 2n as 52, but the FN is equivocal: 54 reported by Gardner and Patton (1976—citing Bianchi et al., 1971, although we cannot find reference to an FN for this species in Bianchi et al., 1971); 56 reported by Gallardo (1982) and Patterson et al. (1984); and 59 according to Spotorno (1986) and Spotorno et al. (1990). We count 56 autosomal arms in all published karyotypes in which the quality of the presentation allows us to make such a count, and we consider this to be the FN for this species.

The karyotype of *A. xanthorhinus* is indistinguishable from those of *A. olivaceus* (Spotorno and Fernandez, 1976) and *A. sanborni* (Gallardo, 1982). In addition, Spotorno (1986) and Spotorno et al. (1990) noted that *xanthorhinus* shares two chromosomal characters with other presumed members of the "Andean group;" these are a pair of telocentric chromosomes not larger than 6.6% of the total karyotype length and two medium-sized metacentric pairs. Thus, karyotypic data support the concept of the "Andean clade" proposed by Smith and Patton (1993). The karyotype of these species of *Abrothrix* differs appreciably from that of *Akodon boliviensis* (2n = 40, FN = 40), the type species of *Akodon* (Gardner and Patton, 1976; see also Patterson et al., 1984).

Allozyme genetic distances for species of akodontine rodents (the genera *Akodon, Bolomys,* and *Oxymycterus*) were estimated by Apfelbaum and Reig (1989). They concluded that *A. xanthorhinus* is not closely related to eight species of the genus *Akodon,* including *A. boliviensis,* thus providing additional evidence that *xanthorhinus* should not be included in *Akodon.*

REMARKS. We thank Bruce D. Patterson, James L. Patton, and Oliver P. Pearson for the many important insights they shared with us. Patterson's insights regarding the taxonomy of akodontine rodents were especially helpful, and we readily acknowledge that he does not agree entirely with our assignment of *xanthorhinus* to the genus *Abrothrix,* suggesting instead that it might best be recognized as a third genus in this complex. While we agree with many of his arguments, we do not feel that a summary account such as this is the place to make a major nomenclatorial change. Robert S. Sikes commented on the manuscript, Jan Decher took the photographs of the skull and mandible, and Milton H. Gallardo provided the photograph of the live animal. Museums that shared their distribution records in addition to The Bell Museum of Natural History (MMNH) were: Museo de La Plata, Museo Argentino de Ciencias Naturales "Bernardino Rivadavia," Museo Municipal de Ciencias Naturales "Lorenzo Scaglia," Centro Regional de Investigaciones Científicas y Técnicas (CRICYT), and Fundación Miguel Lillo, all in Argentina; Instituto de Ecología y Evolución of the Universidad Austral, Valdivia, in Chile; Museum of Vertebrate Zoology, University of California; Field Museum of Natural History, Chicago; United States National Museum of Natural History, Washington, D.C.; and the Zoological Museum, University of Wisconsin. This work was supported by Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina; Centro Regional Universitario Bariloche, Universidad Nacional del Comahue, Bariloche, Argentina; and The Graduate School, University of Minnesota.

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