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The ecology and natural history of a fishing mouse *Chibchanomys* spec. nov. (Ichthyomyini: Muridae) from the Andes of southern Ecuador

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Abstract

Information is presented on the habitat, diet, biogeography and conservation requirements of a species of *Chibchanomys* from the Andes of southern Ecuador. Naturally rare, it is a paramo stream-living species which is probably primarily a predator on aquatic macroinvertebrates, supplemented with fish. The eyes are reduced, the vibrissum and its nerves highly developed. Observations on a captive individual suggest touch has supplanted vision in food location in this species. Occuring at 4000 m, this *Chibchanomys* is one of the highest-living members of its family. Along it a number of other vertebrates, invertebrates and plants, this rodent is restricted to the Cajas Plateau. Threats to the survival of it and the other endemic biota of the plateau are outlined.

Introduction

The Ichthyomyini is a small tribe of sigmodontine rodents (Wilson and Reeder 1993) specialized for a semi-aquatic carnivorous existence in small bodies of running water. Ichthyomyids are exclusively Neotropical, ranging from 16 23′N (northern Mexico) to 11 03′S (central Peru). Though some species occur in lowland forests, most live at high altitudes, often close to or above the tree-line. In his monograph on the systematics and ecology of the tribe, Voss (1988) lists 14 species of ichthyomyid in five genera. Since then Ochoa and Soriano (1991) have described a new species of *Neusticomys* (*N. mussoi*) from the Andes of Venezuela.

In 1981 two ichthyomyines were trapped in a small stream on the Cajas Plateau, Azuay Province, Ecuador. This was followed by another specimen in 1983 and by several live specimens in subsequent years. Three voucher specimens were deposited in the collections of The Natural History Museum, London, England. Originally the specimens were thought to belong to another ichthyomyine, *Anotomys leander* Thomas, 1906. However, closer examination has revealed them to be a new species of the genus *Chibchanomys*, erected by Voss (1988). The species is being described elsewhere. Here I present data on the ecology and natural history of this animal. It is the second known member of this genus and the sixth ichthyomyine species to be recorded for Ecuador.

Material and methods

As part of a series of zoological surveys of the Cajas Plateau, ichthyomyines were purposefully trapped for between 1981 and 1987. Trapping techniques incorporated methods and suggestions from previous

workers on these mammals (Tate 1931; Stirton 1944; Hooper 1968; Starrett and Fisler 1970; Musser and Gardner 1974). At all sites the bait was a mixture of oats, peanut butter and fresh trout flesh (sometimes substituted by tinned tuna or sardine). Traps were checked at dawn and dusk, fresh bait was provided at these times. For details of trapping effort see table 1.

Table 1. Trapping effort for *Chibchanomys* in Cajas
Combined figures for years given. Trapping at all sites occurred between July and September.

Site	No. Trap Nights	No. *Chibchanomys*	No. other animals	Trap Success (%)
Rio Mazan 2 700 m: 1986, '87	480	0	17	3.5
Zorracucho valley (Lake Llaviuco) 3 100 m: 1981, '83	200	1	20	10.0
Chirimanchi 3 300 m: 1983	50		23	46.0
Luspa 3 700 m: 1981, '83, '84	346	2	66	19.1
Torreadora 4 000 m: 1981, '83, '84	369	2	75	20.3
Athiovacu 3 900 m: 1984	121	0	22	18.2
Chapiurcu 3 750 m: 1983	100	0	32	32.0
Pogson and Lees (various sites)	700	1	525	75.0

The Cajas Plateau is the northern-most part of the Serra Machangara, an outlier of the Occidental (western) Cordillera of the Ecuadorian Andes. Rising to 4 138 m at its highest point (Mt. Soldados), it has high-altitude moorland vegetation (paramo) above about 3 100 m, and montane forest below this. The paramo vegetation of Cajas is outlined by Barnett (1992) and described in detail by Ramsay (1992). Barnett (1991) outlines the region's montane forest vegetation.

Results and discussion

Trapping and habitat

The first two specimens of *Chibchanomys* sp. nov. were taken on the same day (22 August) in 1981 from near Lake Luspa (0 2 50 S, 79 30 W: 3 700 m), in large all-metal snap traps placed at climb-out sites on the gravel-and-mud banks of a small bush-covered island in the middle of a small, clear, cold, fast flowing stream, downstream from a small (2.5 m) waterfall. The water was no more than 40 cm deep at any point and appeared extremely well-oxygenated. The bottom was of coarse gravel, stones and bedrock interspersed with large boulders. The stream averaged 1 m wide over most of its length, and ran through an area dominated by tussocks of *Calamagrostris* bunch grass, with scattered shrubs including *Hypericum* (Hypericaceae) and *Bacharis* (Asteraceae). With the exception of algal films on rocks, there was no obvious aquatic vegetation.

Repeat trapping at this locality in 1983 and 1984 yielded no further specimens. In August 1983 in a similar, though slightly more sheltered, habitat near Lake Torreadora (0 2 48 S, 79 17 W: 4 000 m) two *Chibchanomys* sp. nov. were caught alive in Longworth live traps, positioned near water on small stone and mud beaches. One trap was set adjacent

to the water, with guide sticks to the water's edge to funnel in rodents (see Barnett and Dutton 1995). The other was placed in a prominent run at the junction of a beach and the base of an overhang in the bank and faced a hole in the bank, just downstream from a small waterfall. To avoid loss, live-traps were securely tied and weighted with rocks on top of the box. Both animals came from the same (unnamed) stream, which had also been trapped in 1981. In 1983, neighbouring streams of similar appearance were also trapped, but none yielded specimens. The Torreadora animals were kept for observation, but unfortunately escaped before any studies could be made.

Trapping in the Zorracucho valley, on a stream entering the glacial moraine-empounded Lake Llaviuco (0 2 51 S, 79 0 1 W: 3 100 m), yielded one *Chibchanomys* sp. nov. on 7 August 1983. This watercourse was unlike the others from which specimens had been taken. It was between 1.5 and 3 m wide and, in places, the depth exceeded 2 m. The water was sometimes quite muddy and the bottom was a mixture of large (more than 25 cm diameter) stones and mud. The stream was surrounded by land grazed by cows at low intensity. The animal was taken by one of several metal snap traps suspended down a near vertical mud bank to holes (roughly 10 to 25 cm in diameter) just above the water line. It is possible that the animal could have been washed down from further upstream. In July 1981 trapping in the marshland surrounding Lake Llaviuco did not find any ichthyomyines.

Three of the five specimens which I trapped were taken in proximity to small waterfalls. A number of other workers have recorded a similar predilection in other species (Hooper 1968; Starrett and Fisler 1970 for *Rheomys*; Musser and Gardner 1974 for *Neusticomys*; Voss 1988 for *Chibchanomys* and *Ichthyomys*). There are also a number of previous records of ichythomyines using small emergent objects to rest, feed and groom (see Enders 1939; Stirton 1944; Hooper 1968; Starrett and Fisler 1970, for *Rheomys*; Musser and Gardner 1974 for *Daptomys*). This may be a typical piece of ichthyomyine behaviour and could be of use in further fieldwork (see also Stirton 1944).

These habitat features have been found to be of use in surveying other stream-living small mammals (see Woodall 1993; Giraudoux et al. 1995 as examples). Jim and Teresa Clare (pers. comm. 1994) report that on 24 April 1992 their field staff, Andrea Pogson and Caroline Lees, trapped one specimen of *Chibchanomys* sp. nov. on the bank of a small (1.8 m wide) stream "flowing out of Laguna Luspa" at 3 800 m for a BBC-National Geographic wildlife film "Avenue of the Volcanoes". The animal was caught in a Longworth livetrap after an effort of 700 trap nights, extending over 5 months. The trap was positioned about 45 cm from the stream, facing the waters' edge and baited with fresh trout flesh.

Reflecting the views of Voss (1988), that ichthyomyines do not live in still water, *Chibchanomys* sp. nov. was not caught by seeps, standing pools or lakes in the paramo. This is despite considerable trapping effort being expended placing traps at suitable sites around the edges of such places between July and September 1981, 1983 and 1984 by myself and in 1991 and 1992 by Pogson and Lees (although Jim and Teresa Clare [pers. comm. 1994] report that "some people claimed to have seen them around floating vegetation at the edge of lakes"). At lower altitude, in the montane forests of the Cajas Plateau, there was no success in 200 trap nights in small, steep, fast-flowing streams of the Rio Mazan valley (0 2 53 S, 78 59 W: 2 700 m to 3 050 m), nor another 280 trap nights on the banks of the Rio Mazan itself (August 1986 and September 1987). Also unsuccessful were 50 trap nights along bush-covered banks of a stream in the transition zone between montane forest and paramo grassland (Chirimanchi, 0 2 52 S, 79 0 5 W; 3 300 m, August 1983), and on two streams in high paramo (Athiovacu, 0 2 53 S, 80 0 5 W; 3 900 m, August 1984, 121 trap nights: Chapiurcu 0 2 54 S, 80 0 5 W; 3 750 m, July 1983, 100 trap nights).

The records for *Chibchanomys* sp. nov. are between 3 100 m and 4 000 m and only in streams flowing through areas of open grassy vegetation. The streams resemble those in

which Robert Voss trapped *Anotomys leander* in northern Ecuador (see Voss 1988), and contrasts with the situation for *Chibchanomys trichotis* (Thomas, 1897), which Voss (1988) describes as "a typical Andean brook... flow(ing) over cobble and among large boulders" in montane forest. He reports that pools were present, in which organic detritus had accumulated, and that a canopy of woody plants shaded the stream. This closely resembles the montane forest habitat of Rio Mazan where I trapped, unsuccessfully, for *Chibchanomys*. It is not unusual for different members of an ichthyomyine genus to occur in separate habitats. In *Ichthyomys*, for example, species occur in paramo (*I. hydrobates* Winge, 1891), montane forest (*I. stolzmani* Thomas, 1893) and lowland forest (*I. tweedii* Anthony, 1921), and a similar situation exists in *Rheomys* (see Voss 1988).

The previous highest record for *Chibchanomys* was 2 900 m in Colombia, the records from Cajas extend the known altitude range of the genus by some 1 100 m and, with *Anotomys leander*, makes *Chibchanomys* sp. nov. the highest-living known ichthyomyine (see Voss 1988). *Chibchanomys* sp. nov. appears to be uncommon in Cajas. I spent a total of 1 666 trap nights trapping for them, catching 255 small mammals, of which only 5 were of this genus. In 700 trap nights along streamsides in Cajas, Jim and Teresa Clare's field assistants caught about 525 small mammals only one of which was a *Chibchanomys*.

Diet

When the body cavities of the Lake Luspa specimens were opened there was a strong smell of fish (an event also noted by Enders 1939 for *Rheomys raptor hartmanni* Enders, 1939). On-site examination with a handlens of the stomach contents showed the remains of fish (scales, bones with attached flesh), along with larvae of aquatic insects (including Ephemeroptera and Trichoptera). The stomach of the Llaviuco specimen was empty. Fecal matter from the specimens trapped live at Torreadora contained both small particles of bone and insect remains.

The eyes of *Chibchanomys* sp. nov. are very much reduced and recognition of food proximity appears to be entirely tactile, with both vibrissae and forepaws being used. Footage of the specimen photographed by Jim and Teresa Clare, clearly shows *Chibchanomys* sp. nov. eating a fish. At around 4 cm, the captured fish is about one-third the length of the rodent, and is eaten out of the water on the ground, with the forepaws holding and manipulating food and being used in a posture similar to that pictured in Voss (1988) for *I. pittieri*. Food handling behaviour resembles that described by Voss et al. (1982) for *Ichthyomys pittieri* Handley and Mondolfi, 1963 and by Starrett and Fisler (1970) for *Rheomys underwoodi* Thomas, 1906. The animal is seen apparently utilizing the tactile capabilities of its vibrissae when searching for food in shallow water of the stream edge.

Jim and Teresa Clare (pers. comm. 1994) kept their specimen captive for four months. It lived in an enclosure about 1.5 m × 1.5 m, "with vegetation from Cajas and an artificial stream and waterfall". During this time they gave it only small live fish, "which it would catch for itself out of a shallow pool in a reconstructed stream". Though using the artificial burrow provided, the animal also "made several tunnels in mossy vegetation in the set into which it would disappear with the fish". The Clares observed that the animal "was almost exclusively nocturnal though [it] did occasionally emerge during the day for short periods" and that "it would eat several fish a night. The mouse weighed 18 g on arrival and 27 g on its release".

Voss et al. (1982) noted that *Ichthyomys pittieri* made great use of its vibrissae while hunting for food, while Starrett and Fisler (1970) made similar observations on *Rheomys underwoodi*. Voss (1988) has noted that most ichthyomyines have a very well-developed trigeminal nerve, running through the infraorbital foramen and innervating the mystacial vibrissae and related the nerve's size to the vibrissum's putative food-finding function. The vibrissae of *Chibchanomys* sp. nov. are stiff, well-developed and form a

broad, arc-like array in a graded-size series. During field dissections the trigeminal nerve of *Chibchanomys* sp. nov. was seen to be very much enlarged compared to other rodents (e. g. *Akodon*, *Oryzomys*, *Thomasomys*), which were being dissected contemporaneously. From the great development of these nerves one may infer that *Chibchanomys* sp. nov. may also use its whiskers, like *I. pittieri* and *R. underwoodi*, to search for food.

Although some species of Ichthyomyini seem to favour freshwater crabs (Pseudothelphusidae) where these occur (Voss et al. 1982), most (including *Chibchanomys trichotis*, the new species' congener) appear to be primarily eaters of aquatic insects (Voss 1988). This has caused several authors (e. g. Starrett and Fisler 1970; Musser and Gardner 1974) to consider them trophically and behaviourally comparable to northern water shrews (*Neomys*) (see Churchfield 1985). Decapod crustaceans are generally absent from high-altitude streams (see Voss et al. 1982; Ward 1994; Winterbourne 1994), and none were observed at the paramo streams of Cajas nor in the montane forest streams of the Rio Mazan valley, though aquatic invertebrates (including insects) were well represented (Rose Ainesworth, pers. comm. 1988) and present in proportions typical of torrential streams (see Nielsen 1950; Turcotte and Harper 1982; Ormerod et al. 1994). The two types of insect larvae identified preliminarily from stomach contents of captured specimens were the commonest insect orders captured by Ainesworth, with Ephemeroptera being 32% of the catch and Trichoptera 26% (by numbers of individuals) (Rose Ainesworth pers. comm. 1988).

Though the number of *Chibchanomys* stomachs analysed (3) is too small for a definitive statement, the preliminary data indicates a degree of dietary selectivity by this rodent for remains of the area's most abundant aquatic macroinvertebrates were not found in these stomachs. These include large freshwater shrimps (Jim and Teresa Clare, pers. comm. 1994) and gammarids (which Rose Ainesworth [pers. comm. 1988], reported to be ubiquitous and present at densities of up to 170/m2 in streams in paramo and in montane forest). It should be noted that, though both Ainesworth and the Clares found the freshwater invertebrate communities of the Cajas area to be relatively species-rich, Ainesworth (pers. comm. 1988) is of the opinion that "the overall density of invertebrates is relatively low, probably because of high spate frequencies" (see Ali 1968 a, b; Suren 1994; Ward 1994). Under these circumstances, it is possible that fish represent a dietary supplement for *Chibchanomys* sp. nov., rather than a major food item and are resorted to when invertebrates are scarce. Fairley (1972) and Woollard et al. (1978) have shown that the persistence of scales and bones may lead to the overestimation of fish in the diet of aquatic carnivores. Consequently, despite the presence of some piscean remains, it is likely that *Chibchanomys* sp. nov. resembles *C. trichotis* and other ichthyomyines in being, primarily, an aquatic insectivore.

Biogeographical considerations

The current records for *Chibchanomys* sp. nov. lie within the known range of the genus, though it is the only member of the genus yet recorded for Ecuador. The only other known member of the genus *Chibchanomys*, *C. trichotis*, is known from four places: two (including the type locality) in Colombia (eastern Departamento Cundinamarca), on the Tachira Andes (Estado Tachira, Venezuela) and, far to the south, the Cordillera Carpish (Departamento Huanuco, Peru) (Fig. 1).

The geographic location of *Chibchanomys* sp. nov. in the middle of the apparent range of *C. trichotis* suggests that it may be appropriate to reconsider the taxonomic position of the southern, Peruvian, populations of *C. trichotis*. Voss (1988) notes that "character differences may indicate that southern populations of *Chibchanomys* [*trichotis*] are phenotypically distinctive" from those in Colombia and Venezuela, but notes that "more material is required to substantiate this conjecture", there being, at present, insufficient material to

Fig. 1. Distribution of collection localities for *Chibchanomys* (locations and grid references for *C. trichotis* localities follow Voss, 1988).

C. trichotis
1: Buena Vista, Tachira Andes, Venezuela (ca. 7 26 N, 72 26 W)
2: San Cristobal, Cordillera Oriental, Colombia (4 35 N, 74 05 W)
3: Cundinamarca, Cordillera Oriental, Colombia (4 36 N, 74 05 W)
4: Cordillera Carpish, Depto. Huanaco, Peru (ca. 9 40 S, 76 09 W)

C. sp. nov.
4: Cajas Plateau, Azuay Province, Ecuador. (2 50 S, 79 30 W)

be sure. If the southern population of *C. trichotis* do form a validly separate taxon then it would join a number of other taxa which have a separate sister species, or sub-species, whose distribution is centred on the Carpish Mountains (see Cracraft 1985; Parker et al. 1985; Robbins et al. 1994), a situation paralleling that found in Cajas. These include the amethyst-throated Sunangel (*Heliangelus amethysticollis*) (d'Orbigny and Lafresnage, 1838), a high-altitude hummingbird with sub-species in Tachira, Bogota, south-western Ecuador and north-central Peru (Fjeldsa and Krabbe 1990), and the chestnut-bellied cotinga (*Doliornis remseni* Robbins, Rosenberg, and Sornoza Molina, 1994) (see Robbins et al. 1994).

The Cajas Plateau is some distance from the other sites where specimens of *Chibchanomys* have been taken (around 940 km south from Bogota and 1000 km north from Huanuco). Similar disjunct distributions also occur in other ichthyomyine genera (Voss 1988). Such patterns are likely to be the result of dispersion in the minor interglacials, subsequent isolation and extinction of intervening populations in the cooler and drier periods of the four major Andean Pleistocene glaciations, with the current absence of species from wide areas of apparently suitable habitat resulting from the habitat preferences and

physiological limitations of Holocene forms, which have inhibited recolonization. This type of explanation was advanced by Chapman (1926) to account for disjunctions in the distribution of high Andean birds and has, with modifications, been used by many subsequent authors, over a wide range of taxa (Fjeldsa and Krabbe 1990; Vuilleumier and Monasterio 1986).

The coverage of small mammal collecting in the Andes is still patchy and there are many areas which are unexplored or little known (Reig 1986; Voss 1988; Carleton and Musser 1989). However, most of the mountains in the Ecuadorian Andes (e. g. Chimborazo, near Banos; Pichincha, near Quito) have been quite well trapped, and most include ichthyomyines amongst their known fauna. It is thus unlikely that the apparent geographical restriction of *Chibchanomys* sp. nov., and the absence of *C. trichotis*, are artefactual and it is highly probable that the new species of *Chibchanomys* is restricted to the Cajas Plateau, or (probably) the Serra de Machangara as a whole. However, range extensions for ichthyomyines are still being reported (Velasco Abad and Alberico 1984), so it may be premature to consider any such conclusions definitive at this time (in this context, compare, for example, distributional data for *Rheomys* from Hooper 1968 and Voss 1988). It is hoped the field key to known Ecuadorian Ichthyomyini (to be presented with the species' full description) will assist further work in this regard.

If *Chibchanomys* sp. nov. were to be found to be endemic to the Cajas Plateau/Serra Machangara, it would join the marsupial *Caenolestes tatei* Anthony, 1923 (Barnett 1991), two rodent sub-species *Phyllotis haggardi fuscus* Pearson, 1958 and *Thomasomys gracilis hudsoni* Anthony, 1923 (Cabrera 1961; Pearson 1958), the hummingbirds *Metallura baroni* Salvin, 1893 (Meyer de Schauensee 1966; Ortiz-Crespo 1984; Fjeldsa and Krabbe 1990) and *Coelogena iris hesperis* (Gould, 1853) (Meyer de Schauensee 1966; Fjeldsa and Krabbe 1990), an *Eleutherodactylus* frog (William Duellman, pers. comm.), a species of *Oroperipatus* (Onychophora) (Morley Read, pers. comm. 1988), the rove beetle genus *Cajachara* and a variety of as-yet-undescribed staphylinid beetles (Ashe and Leschen 1995), the puyas (Bromeliaceae) *Puya pygmea* L. B. Smith, 1952 and *P. nutans* L. B. Smith, 1952 (Gilmartin 1972; Gentry 1977) and the tillandsias (Bromeliaceae) *Tillandsia cuccullata* L. B. Smith, 1958, *T. rupicola* Baker, 1888, *T. pachyaxon* L. B. Smith, 1958, *T. buseri nubicola* Gilmartin, 1968, and *T. stenoura mauroi* Gilmartin, 1968 (Gilmartin 1972). All of these taxa are restricted to this outlier of the Western Cordillera.

Speciation patterns resulting in clusters of endemics on particular mountains or mountain chains are quite common in Andean Ecuador. For example, Mt. Pichincha has two endemic sub-species of rodent (*Phyllotis h. haggardi* Pearson, 1958; *Aepomys lugens vulcani* Thomas, 1890), an endemic hummingbird species (black-breasted puffleg *Eriocnemis nigrivestris* Bourcier and Mulsant, 1852) and several endemic sub-species (tourmaline sunangel *Helianthus e. exortis* Fraser, 1846; tryrian metaltail *Metallura tyrianthina quitensis* Loddges, 1832; glowing puffleg *Eriocnemis vestitus paramillo* Lesson, 1838). While subspecies of the Chimborazo hillstar (*Oreotrochilus estrella soderstromi* d'Orbigny and Lafresnage, 1838) and a rodent (*Phyllotis h. elegantulus* Pearson, 1958) are confined to Mt. Cotopaxi, (bird data: Meyer de Schauensee 1966; Fjeldsa and Krabbe 1990; rodent data: Cabrera 1961). Parallel patterns of restricted distribution are also found in many bromeliads (Gilmartin 1972).

Conservation

As pointed out by Happel et al. (1987), rarity is a composite term, comprising of low population density and restricted range. *Chibchanomys* sp. nov. appears to fulfil both of these criteria. Though allowance must be made for the fact that ichthyomyines are known to be difficult to trap (Musser and Gardner 1974; Voss 1988), *Chibchanomys* sp. nov.

would appear to favour a limited range of habitats and be uncommon within them. As trapping in neighbouring montane forest streams has had no success, the species is very likely to be restricted to streams in paramo vegetation, Happel et al. (1987) have shown that species with low densities, and restricted ranges and habitat preferences are those most vulnerable to extinction.

In addition to *Chibchanomys*, the Cajas Plateau has other rare small mammals (Barnett 1991, 1992), and a number of rare and/or restricted vertebrates, invertebrates and flowering plants. In Ecuador, tourism has increased greatly in the last few years (Boo 1990), and the Cajas Plateau area has become increasingly popular with visitors (Steven Leftwich, pers. comm.). A major road has recently been completed across the plateau and, as also noted by Ashe and Leschen (1995), this may increase the visitor volume to the point where "it is possible that Cajas may be(come) severely impacted by human activity in the near future". The negative environmental impacts of large numbers of visitors on high altitude areas is well known (Meyer 1993; Young et al. 1994; Andersen 1995; Eber 1992 for impacts on high-altitude terrestial ecosystems, Suren 1994; Ward 1994; Winterbourn 1994; Allen 1995 for impacts on high-altitude aquatic ecosystems and Kemf 1993 for a general overview). Consequently, the status and environmental health of the Cajas region should be monitored to ensure the survival of its endemic fauna and flora are not threatened. This may be further encouraged by community-orientated habitat preservation and ecotourism initiatives (Boo 1990).

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Zusammenfassung

Über Ökologie und Naturgeschichte einer fischenden Maus Chibchanomys spec. nov. (Ichthyomyini: Muridae) aus den Anden des südlichen Equador.

Über Habitat, Nahrung, Biogeographie und Erfordernissen zur Arterhaltung einer neuen Art des Genus *Chibchanomys* aus den Anden des südlichen Equador wird berichtet. Diese Art lebt an Bachsystemen des Paramo, ist sehr selten und ernährt sich wahrscheinlich hauptsächlich von größeren aquatischen Invertebraten aber auch von Fischen. Die Augen dieser Nager sind verkleinert, Vibrissen und deren Nerven stark entwickelt. Beobachtungen an einem gefangenen Individuum lassen vermuten, daß optische Leistungen bei der Nahrungssuche weitgehend durch Tasten ersetzt werden. Diese Art der Gattung *Chibchanomys* kommt in Höhen von 4000 m vor und ist somit der am höchsten lebende Vertreter der Familie. Gemeinsam mit einigen anderen Wirbeltieren, Wirbellosen und Pflanzen ist dieser Nager ausschließlich auf dem Cajas Plateau Equador verbreitet. In einem Überblick wird auf Gefahren hingewiesen, die der gesamten endemischen Flora und Fauna dieses Plateaus drohen.

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