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Museum Koenig Bonn

Eleven years of field work - five previously unknown rodent species discovered in mountain forests of Ecuador

Previously only recorded as a single species, at least five additional new species are hiding under the name *Chilomys instans*. After eleven years of field work in different regions of the Ecuadorian Andes, an international group of researchers with the participation of the LIB was able to describe five new species of the mouse genus *Chilomys*. The species, which were so far completely unknown to science, live at altitudes between 1,200 and 4,050 metres. The genus *Chilomys* turns out to be a group of morphologically distinctive Andean rodents with unique specialisations. The names of the new mice species honour important personalities.

The expert group of the now published study, including Jorge Brito (INABIO - Instituto Nacional de Biodiversidad, Quito), Nicolás Tinoco (PUCE - Pontificia Universidad Católica del Ecuador, Quito), Miguel Pinto (Charles Darwin Foundation, Galápagos), Rubí García (INABIO), Claudia Koch (LIB, Leibniz Institute for the Analysis of Biodiversity Change, Bonn), Vincent Fernandez (NHM - Natural History Museum, London), Santiago Burneo (PUCE) and Ulyses Pardiñas (IDEAus-CONICET - Instituto de Diversidad y Evolución Austral, Puerto Madryn) collected a considerable number of individuals of the mouse genus *Chilomys*.

"Using comprehensive methods, we have been able to prove that the species previously referred to as *Chilomys instans* in Ecuador is indeed a complex comprising at least five new species," explains Dr. Claudia Koch, curator at the LIB, Museum Koenig Bonn. This was based on genetic studies as well as morphometric analyses and three-dimensional cranium reconstructions made by means of computer tomography images.

Although the genus *Chilomys* has been considered monotypic for most of the time since its description in 1897, prior to recent discoveries it consisted of two species: *C. fumeus*, which is restricted to the northernmost Andes in Colombia and Venezuela, and the widespread *C. instans*, the type species of the genus, which occurs from central Colombia to northern Peru. Both species show a high degree of similarity (indeed, they were largely considered synonyms) and were only distinguished by subtle metrical features.

Based on these remarkable new findings, the researchers provide a revised genus diagnosis that is expanded to include several important craniodental characters, such as anteriorly directed upper incisors and microdontia. The results also suggest that *Chilomys* probably has additional diversity in much of Colombia and Peru, necessitating a revision of the entire genus.

Jorge Brito, initiator and first author of the publication, highlights that he first caught a specimen of *Chilomys* in the Polylepis forest in Carchi province in 2011 during his bachelor thesis. This gave rise to the idea of more intensive research into this rodent group, to which few people had paid attention until then, and over time he was joined by several national and international experts. The small animals are difficult to catch, which is why the extensive field studies took several years.

The co-authors chose the names for the new species as homage to various personalities: *Chilomys carapazi* from the western flank of the Andes in honour of Richard Carapaz, an Ecuadorian professional cyclist who, like this new species, comes from El Carchi province. *Chilomys georgeledecii*, also from the western flank of the Andes in Carchi Province, was named in honour of the Czech-American conservationist George Ledeci, in recognition of his efforts

to protect and conserve forests in the Andes of Ecuador. *Chilomys neisi* lives between the provinces of El Oro and Zamora Chinchipe and was dedicated to the Ecuadorian Olympic weightlifting champion, Neisi Dajomes. *Chilomys weksleri*, which is distributed in the foothills of the Western Cordillera of the Central Andes between the provinces of Pichincha and Cotopaxi, and *Chilomys percequilloi*, which occurs in several localities in the provinces of Napo to Morona Santiago on the eastern flank of the Andes, were named in honour of the Brazilian rodent specialists Marcelo Weksler and Alexandre Percequillo, who made great contributions to the study of mammals in the Neotropics.

The authors of the five new *Chilomys* species conclude their study by suggesting that the newly discovered diversity is due to allopatric speciation (speciation by geographic isolation) related to the effects of quaternary glacial cycles on vegetation belts. The genus *Chilomys* emerges as a group of morphologically distinctive Andean rodents with unique specialisations related to the position of the incisors, probably indicating a diet specialised in invertebrates.

Source

Brito, J., Tinoco, N., Pinto, C. M., García, R., Koch, C., Fernandez, V., Burneo, S., Pardiñas, U. F. J. (2022): Unlocking Andean sigmodontine diversity: five new species of *Chilomys* (Rodentia: Cricetidae) from the montane forests of Ecuador. PeerJ 10:e13211. DOI: https://doi.org/10.7717/peerj.13211

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About the LIB

The LIB is dedicated to researching biodiversity and its changes, the results of which are disseminated to the wider society in an educational manner. In order to better understand the current mass extinction of flora and fauna, researchers are looking for connections and causes of – often – man-made changes. The goal is to develop solutions for the preservation of ecosystems and species in order to maintain the basis of current life.

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Caption: The new species *Chilomys percequilloi.*
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Caption: The new species *Chilomys carapazi* (Zeichnung von Glenda Pozo).
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Caption: The new species *Chilomys georgeledecii.*
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