



## Press Release State Museum of Natural History Stuttgart

### **Tarsier research: A "gnome on the mountain"- Small, fascinating, and old!**

**An international team of researchers has shown that the evolutionary lineage of the pygmy tarsier *Tarsius pumilus* split from the predecessor of all other Sulawesi tarsiers about 10 million years ago - long before this fascinating primate genus further diversified into almost a dozen species now roaming Sulawesi's lowland rainforests.**

*Stuttgart, Germany, April 08, 2022.* Tarsiers are small, nocturnal primates. They live in the understory of Southeast Asian rainforests and feed mainly on insects. There are 14 known tarsier species, 12 of which live only on the island of Sulawesi or offshore islets. The smallest and most enigmatic of them is *Tarsius pumilus*, also called the pygmy or mountain tarsier. The first ever genetic analyses of this mini-primate have revealed that the "gnome on the mountain" looks back at approximately 10 million years of independent evolution. Its lineage thus split from the other known Sulawesi tarsiers several million years before these diversified further. The data, obtained by an international team of scientists led by tarsier expert Dr. Stefan Merker and geneticist Dr. Laura Hagemann of the State Museum of Natural History in Stuttgart, Germany, shed light on the evolutionary history of tarsiers and the spectacular biogeography of the Malay Archipelago. The results were published in the journal *Biology Letters*.

### **One of the most enigmatic primates on Earth**

Until now, not much was known about pygmy tarsiers. First discovered in 1917, the mountain (or pygmy) tarsier was only known from two museum specimens for 70 years. It wasn't until 2008 that U.S. researchers Dr. Sharon Gursky and her then doctoral student Nanda Grow, together with their Indonesian colleagues, were able to locate living representatives of this elusive species. "Its secret life in the mountains of Sulawesi, hitherto largely hidden from the eyes of science and the public, deems the pygmy tarsier to be one of the most mysterious primates on the planet. There has been more speculation than knowledge about its evolutionary history. I am therefore all the more pleased that we can provide new insights through our genetic study", says Dr. Laura Hagemann, the lead author of the study. Among Sulawesi's already fascinating tarsiers, *Tarsius pumilus* is in many ways an exception. Unlike all other tarsiers that occur in the lowlands, it lives exclusively in mountain forests, more than 1800 meters above sea level. Furthermore, it is much smaller than the other representatives of its genus and with a body size of not even 10 centimeters easily fits into the palm of a human hand. Other peculiarities include thicker fur, pronounced finger and toe nails, and the lack of the characteristic duet song—at least at a frequency perceptible by human ears.

### **A long-term research project: further studies are planned**

"These tiny primates with the large eyes have been with me for half my life now and we still keep finding new, fascinating aspects of their evolution and ecology," says Dr. Stefan Merker, who has maintained a successful cooperation with the Primate Research Center PSSP in Bogor, Indonesia, since 1998 and has spent several years "among tarsiers" on Sulawesi.



Reconstructed paleogeographic maps show that the likely timing of the phylogenetic split of the pygmy tarsier lineage coincides with the rise in sea level between the western and eastern parts of the island. One possible scenario is that the ancestor of *Tarsius pumilus* was separated from the predecessor of the lowland tarsiers by an insurmountable ocean barrier. "Interestingly, there were likely no mountains on the western part of the island at that time. This suggests that displacement into the mountains wasn't the underlying mechanism for speciation," says Dr. Laura Hagemann. A more comprehensive sample collection is needed to estimate the current range of the pygmy tarsier and to give further insights on possible distribution patterns. For this purpose, the two Stuttgart Museum researchers are planning another trip to Sulawesi.

### **For the editors**

#### **Original publication:**

Laura Hagemann, Nanda Grow, Yvonne E.-M. B. Bohr, Dyah Perwitasari-Farajallah, Yulius Duma, Sharon L. Gursky and Stefan Merker: "Small, odd and old: The mysterious *Tarsius pumilus* is the most basal Sulawesi tarsier". Publication date: 03/30/2022.

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#### **Image material:**

**Picture 3:** *Bild1\_Zwergkoboldmaki\_Tarsius pumilus\_Foto\_Nanda Grow.jpg*

Description: *Tarsius pumilus* is the most basal of all Sulawesi tarsiers, meaning it forms the sister group to all other tarsier species on the island.

Photo/Copyright notice: Dr. Nanda Grow

**Picture 2:** *Bild2\_Zwergkobildmaki\_Tarsius pumilus\_Foto\_Nanda Grow.jpg*

Description: The *Tarsius pumilus* lineage split from the predecessor of the remaining species about 10 million years ago - several million years before the genus further diversified into the lowland species living on Sulawesi and the surrounding islands today. Photo/Copyright

notice: Dr. Nanda Grow

**Picture 3:** *Bild3\_Laura\_Hagemann\_Labor\_SMNS\_M.Rech.jpg*

Description: Genetic analyses by Dr. Laura Hagemann and colleagues provided evidence of a long evolutionary history of the Sulawesi mountain tarsier *Tarsius pumilus*.

Photo/Copyright: SMNS, M. Rech



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Thank you.

**Background:**

Sulawesi is the largest island of the Wallacea region and is located in the collision zone between major tectonic plates. Their shifts have repeatedly led to serious geological changes in the region in the past; it is only since about 1 million years that the outlines of the island look as distinctive as we know them today. In addition, Pleistocene sea level fluctuations led to temporary water barriers and thus to characteristic patterns of "allopatric speciation," i.e., speciation in geographic isolation. This makes Sulawesi a unique biodiversity hotspot, where the evolutionary history of the diverse flora and fauna is inevitably linked to the geological past of the region.

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