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NOTE

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Range extension and first confirmed record of the Flightless Anomalure *Zenkerella insignis* (Matschie, 1898) (Mammalia: Rodentia: Anomaluridae) in Nigeria

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The Cameroon Scaly-tail *Zenkerella insignis* (Matschie, 1898) is one of the least studied of African mammals. It has so rarely been encountered that virtually nothing has been published about its behaviour, feeding habits, and time budgets (Heritage et al. 2016). The species was previously classified in the genus *Zenkerella* under the family Anomaluridae along with *Idiurus* and *Anomalurus* (Kingdon, 2013), though Marivaux et al. (2017) adds a fourth genus *Anomalurops*. The new study by Fabre et al. (2018), however, puts the genus *Zenkerella* under a new completely different well-circumscribed family called Zenkerellidae based on new phylogenetic results. This puts Anomaluridae and Zenkerellidae as two separate families under the Suborder Anomaluromorpha, which are endemic to the thick rainforest habitats of western and central Africa (Kingdon 2013) and peculiar among mammals for the two rows of pointed scales on the ventral side of their tufted tail, which helps them to climb in the forest canopy (Marivaux et al. 2017; Fabre et al. 2018).

Cameroon Scaly-tail *Zenkerella insignis* stands out from the rest of the suborder. It is presently the only

known species in the family Zenkerellidae and it lacks patagia, the membranes possessed by the genera in Anomaluridae which enable them to glide, similar to gliding squirrels (Kingdon 2013; Heritage et al. 2016; Marivaux et al. 2017). Kingdon (2013) suggests the absence of patagia could be an adaptive feature for the species, enabling it to adapt to very thick vegetation. *Zenkerella* has been viewed as an important example of macroevolutionary reversion in the development of locomotory adaptations because it is assumed that the species lost its patagia and hence its ability to glide (Fabre et al. 2018). Molecular analysis, however, proves that the species is from a lineage called Zenkerellidae, a distinct non-gliding, and long-lived lineage. This would mean that the lineage never developed patagia or any adaptation that enables gliding flight, rather than having lost its capabilities of performing gliding flight (Fabre et al. 2018; Heritage et al. 2016).

Remarkably, the first pictures of a live specimen of *Zenkerella insignis* were taken in 2015 on the Island of Bioko by Curtis Hart (Dinets 2017). Dinets (2017) also recorded his encounter with a *Zenkerella* in the lowland

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Image 1. Lateral view of *Zenkerella insignis*.



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Image 2. Posterior view of *Zenkerella Insignis*.



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Image 3. Image showing the curious specimen with the digits and claws.

forest of the Dzanga-Sangha Special Protected Area in the central African republic (Dinets 2017). From his observations, the specimen had a preference for dense thickets and was nocturnal, observed at 22.00h, a possible reason why it was so rarely seen and observed in the wild (Dinets 2017).

We encountered the elusive and mysterious flightless Cameroon Scaly-tailed on 17 May 2019. We were in the Queen's Forest (core zone) of Omo Forest Reserve sitting under a short tree at 6.756N & 4.353E from 18.00h. The vegetation at that particular location was

relatively dense and shrubby with little undergrowth. At about 20.08h, we heard something rustling just above where we were seated. We put on our headlights and saw the scaly-tail on the branch directly above us. We were instantly interested in the specimen because of its tail tuft which stood out unlike in any other previously observed species in the forest reserve. The tail tuft is the shape of a spherical fan. The branch was at a height of about 5m above the ground. When we put on our headlights, the animal ceased moving for a few seconds and just glared at the light source similar to what was



Image 4. Ventral image of the specimen showing the prominent maxillary incisors and the smaller mandibular incisors.



Image 5. Image showing the scales on the anterior section of the tail.

previously observed by Dinets (2017). Then, it started traversing the tree branch going up and down. This could be a display of territoriality, seen in some male and female rodents, or investigative behavior. It could also be a protective display to ensure it is not followed back to its young ones if it had any. This behaviour would have been easier to understand if we could tell the sex of the specimen. Its territorial behaviour was further confirmed when the specimen urinated directly on the branch and upon us. Observations continued for about 19 minutes while pictures were taken.



Image 6. Image showing the facial features of the specimen.

Unlike other rodents, the specimen showed no signs of fear, probably because it had never seen or interacted with humans before. It seemed simply curious, looking down from different positions on the branch to get a better view of us.

The specimen had a dark grey body pelage (Image 1). The tail tuft and ankle tuft (both visible in Image 3, 7) were clearly black in colouration. It is also noticeable that the ear of the observed specimen lacked fur and was almost bare even on the outer surface of the ear (Image 2).



Image 7. Image showing the tail tuft of the specimen.

Similar to the observation by Dinets (2017), the tail of the specimen was kept straight out from the specimen's body and was used as a rudder. Unlike descriptions from previously curated specimens, the observed *Zenkerella* had tail hair that stood straight on end in a spiky manner rather than the bushy hair depicted from curated specimens (Image 3, 7). Dinets (2017) suggested that the very conspicuous tail tuft is used for either intraspecific signaling or to distract predators from vital parts of the body.

Another observation made was that the specimen had two prominent maxillary incisors that were larger

than the mandibular incisors visible in Image 4 and 6 (Heritage et al. 2016). The specimen also had four and five digits on its fore and hind feet respectively and all digits ended in decurved claws (Image 3, 5, 6) (Heritage et al. 2016).

This is the first confirmed record of the Cameroon

Scaly-tail *Zenkerella insignis* in Nigeria and the first set of clear pictures showing accurate morphological descriptions of the species. This find is quite remarkable because it extends the species' range significantly westwards across important biogeographic boundaries such as the Cameroonian volcanic range and across the large Cross and Niger rivers. Given the distance of over 800km from the previously described sightings, the observation could very well be a subspecies or a new species in the *Zenkerella* genus.

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