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Wet Climate Drives Melanistic Giant Squirrel *Ratufa macroura melanochora* in Wet Zone of Sri Lanka**Pathirana K., Seneviratne S.S.****Department of Zoology and Environment Sciences, University of Colombo, Colombo 03, Sri Lanka***sam@sci.cmb.ac.lk***Abstract**

The species; *Ratufa macroura* exists in three different coat colorations. *R. m. melanochora* in Sri Lankan wet forests has morphologically diverged from the *R. m. macroura* in the intermediate zone and *R. m. dandolena* shared between Sri Lankan Dry zone and Mainland India. This study investigated the correlation of geo-climatic parameters with the morphometry and colorimetry of *R. m. melanochora*; the level of divergence of *R. m. melanochora* in morphological and vocal aspects from the other two subspecies; and the exact phylogenetic position of the Wet zone melanistic *R. macroura*. We studied 18 live and fresh specimens of *R. macroura* and 56 preserved museum skins housed at the National Museum, Colombo. We collected blood or fur samples, morphometric and anatomical data, and hair samples. Colorimetric data were obtained using an Ocean Optics portable spectrometer. Both morphometric and pelage-associated characters showed clinal variation with the rainfall and biogeographic distance. Squirrels in wetter areas have dark and long fur while fur length increased with the increasing biogeographic distance from the mainland. Hence the wet zone Giant Squirrels are larger and darker than the other two forms. The conducted multivariate analysis (PCA) to determine differences among three populations showed no clear clustering in both skin and skull morphometric values. The dorsal and ventral coat color gets darker as the cline moves from dry zone to wet zone, which makes the extreme wet zone individuals black in dorsal coloration. The spectral data of *R. m. melanochora* displayed the highest absorbance. The microscopic structure of hair changes distinctly with densely packed melanin granules and fizzy hair with an oval-shaped cross-section, which may be an adaptation to the humid environment that, in-turn may assist in thermoregulation. Other than above mentioned phenotypic characters, *R. m. melanochora* is vocally distinct with chatter calls with higher repertoire, lower pulse frequency, lower pulse duration, and lower amplitudes. The genetic divergence of *R. m. melanochora*, however, is not clear from the rest of the *R. macroura* in Sri Lanka. In minimum spanning networks inferred for cytochrome-b and 12s regions of the genus, the *R. macroura* population in Sri Lanka share the same haplotype cluster. According to the concatenated and coalescent analyses of cytochrome-b and 12s genes, *R. m. melanochora* shares the subspecies status with *R. m. macroura* and *R. m. dandolena*. This shows that *R. m. melanochora* is not genetically distinct as claimed by studied gene regions. This proves that the melanistic form of Sri Lankan Grizzled Giant Squirrel is a unique evolutionary entity shaped by a wet climate in its isolated island habitat.

Keywords: Melanism, Climate, Ratufa, Wet forest, Sri Lanka