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Microscopic hair characteristics of Namdhapa Flying Squirrel *Biswamoyopterus biswasi* Saha, 1981 (Sciuridae: Rodentia: Mammalia)

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Abstract

The microscopic characteristics of dorsal guard hairs of the Namdhapa flying squirrel *Biswamoyopterus biswasi* were examined using the optical light microscope at the Zoological Survey of India during May 2016. The unique microscopic characteristics such as 'multicellular' and 'multiserial ladder', the structure of medulla and 'biconvex', shape of the cross-section of dorsal guard hair determines the species identity of *B. biswasi*. The high-resolution photo-micrographs and key characteristics of hair presented here can be used as an appropriate reference for species identification.

Keywords: *Biswamoyopterus biswasi*, hair characteristics, dorsal guard hair, multicellular, biconvex

1. Introduction

The Namdhapa flying squirrel *Biswamoyopterus biswasi* has been classified as a 'Critically Endangered' species as per the IUCN Red List of Threatened Species (2016-3), as the occurrence of this species is very less in its range [7]. This squirrel was described on basis of a single holotype specimen by S.S. Saha, the scientist of the Zoological Survey of India, India during 1981. The species is endemic to the Namdhapa National Park, Arunachal Pradesh, India; large sized squirrel having thick and soft pelage; the crown is violet -grey in colour; there is a faint orange- rufous tint on the patagium and the underparts are characteristically white in colour; pelage morocco red grizzled with white above [1].

There are few hair characteristics studies available on different species of Indian squirrels by Bahuguna [2, 3, 4], Sarkar [8] and Kamalakannan [6]. However, hair characteristic of the study of Namdhapa flying squirrel *Biswamoyopterus biswasi* is unknown. Therefore, a detailed microscopic hair characteristic of species was presented in this paper.

2. Materials and Methods: The dorsal guard hairs were collected from the preserved skins of *B. biswasi* housed at the National Zoological Collections of Zoological Survey of India, Kolkata, India during May 2016. The cuticular scale characteristics, medullary configuration and cross-section of dorsal guard hair were studied according to a standard methodology of Brunner and Coman [5] and Teerink [9] and the microscopic hair characteristics were observed and photographed using an optical light microscope (Olympus BX41) under 400 X magnifications.

3. Results and Discussion

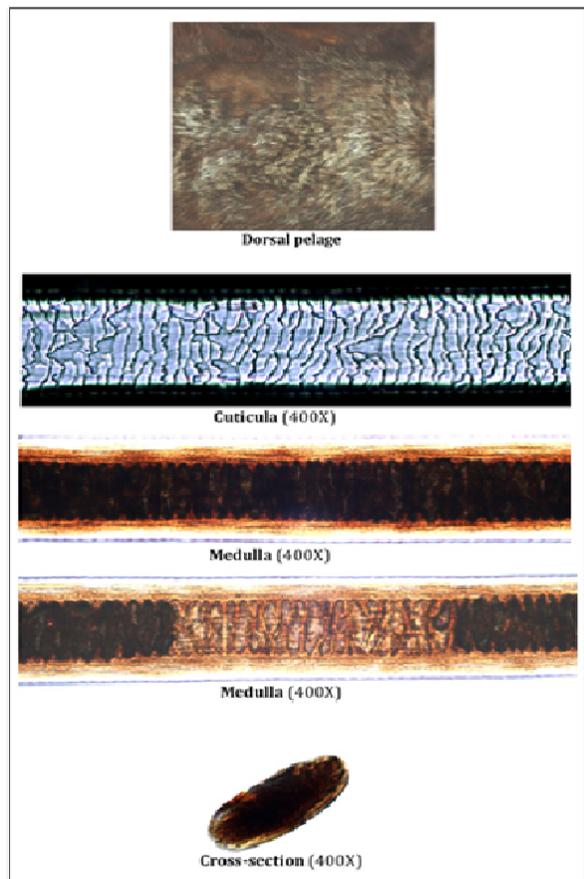
The cuticular characteristics of dorsal guard hair of *B. biswasi* were observed as the scale position was 'transversal', scale patterns was 'regular wave', the structure of scale margins was 'smooth' and the distance between scale margins- 'near'; the medullary characteristics hair of *B. biswasi* were as: composition of medulla- 'multicellular', the structure of medulla- 'multiserial ladder', and form of the medulla margins- 'scalloped', and the cross-section of hair was observed as 'biconvex' shape (Table 1; Fig 1).

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Table 1: Microscopic hair characteristics of *Biswamoyopterus biswasi*

Cuticular scale position	Transversal
Cuticular scale patterns	Regular wave
Cuticular Structure of scale margins	Smooth
Distance between cuticular scale margins	Near
Composition of medulla	Multicellular
Structure of medulla	Multiserial ladder
Margins of medulla	Scalloped
Shape of cross-section	Biconvex

**Fig 1:** Photo-micrograph of dorsal guard hair of *Biswamoyopterus biswasi*.

Morphologically, *B. biswasi* can be distinguished from all other squirrels by its pelage colour, which is morocco red grizzled with white above [1]. The unique microscopic characters such as ‘multicellular’ and ‘multiserial ladder’, the structure of medulla and ‘biconvex’, the shape of the cross-section of dorsal guard hair also determines the species identity of *B. biswasi*. So far, there is no specific study on hair characteristics of this species, but few studies are available on different species of Indian squirrels viz., *Petaurista petaurista* and *Funambulus pennantii* [2]; genus *Callosciurus* [3]; genus *Ratufa* [4], Order Rodentia [8]; genus *Ratufa* [6], of which the medullary structure of hair was observed as ‘multicellular in rows’ and ‘multiserial ladder and shape of the cross-section was ‘oval or oblong’. Therefore, this study provides complete microscopic characters of hairs of *B. biswasi* for species identification

4. Conclusion

This species was discovered on basis of single specimen. Since its discovery, there is no sighting of this species in the range of Namdhapa. Therefore, the photo-micrographs and key characteristics provided here can be used as an appropriate reference for species identification *B. biswasi*, if any suspected hair samples available.

5. Acknowledgements

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6. References

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