

Original Research Article

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Hair Morphology of Striped Hyena *Hyaena hyaena* (Linnaeus, 1758)

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The microscopic characteristics of dorsal guard hairs of *Hyaena hyaena* were examined using optical light microscope to know its hair morphology. The hair of *H. hyaena* is diagnosed by its unique medullary characteristics i.e. the composition of medulla- ‘unicellular regular’, structure of medulla- ‘simple or narrow medulla lattice’ and the ‘oblong’ shape cross-section. The photo-micrographs and characteristics of dorsal guard hairs are presented here may be used for the species identification.

Introduction

Hair morphology is adapted to identify the mammal's species when the external morphology is unable to provide a proper result for identifying the mammal's species (Teerink, 1991; Chakraborty and De, 2010). The physical and microscopic characteristics of the Indian mammals have been well documented by many authors (Bahuguna *et al.*, 2010; Chakraborty and De, 2010; Sarkar *et al.*, 2011; Kamalakannan *et al.*, 2013; Kamalakannan, 2017a and b). The different orders of class Mammalia were dealt by De, 1993; Primates; Chakraborty and De, 2010; Carnivora; Bahuguna *et al.*, 2010; selected mammals; Sarkar, 2012; Rodentia; Kamalakannan, 2015, Artiodactyla and Lagomorpha). However, scanty information is

available on the hair structure of *Hyaena hyaena*. Therefore, the present study was undertaken to provide a detailed microscopic characteristics of hairs of *H. hyaena* for its species identification.

The striped hyena is a large dog-like carnivore placed under separate family Hyaenidae; its pelage is long and the coat colour is tawny-yellow infused with broad vertical black stripes on the flanks, and fore and hind legs; heavy crest of long hairs over the neck and back; in India this animal is distributed in south to the Nilgiri hills, west to Gujarat, north to lowland of Jammu and Kashmir and Kumaon, east to West Bengal; habitat loss and degradation, poisoning and

poaching are the major threats to this species; conservation status of this species is as per the IUCN Red List- Near Threatened; Indian Wildlife (Protection) Act, 1972- Schedule III; CITES- Appendix- III (Menon, 2014).

Materials and Methods

About 10-15 tufts of dorsal guard hair were collected from the mid-dorsal region of dry specimens of *H. hyaena* present in the National Zoological Collection, Mammal and Osteology Section of the Zoological Survey of India, Kolkata, India. The samples were washed thoroughly in carbon teta chloride after by Chakraborty *et al.*, (1996) to remove the dirt of exogenous materials. Microscopic characters such as scale position, scale pattern, scale margin and scale margin distance of dorsal guard hair were studied with help of the digital camera fitted on an optical light microscope (Olympus BX41).

The medullary configuration and composition, structure and margins of the medulla and cross-section of dorsal guard hair were recorded and photographed. Nomenclature of different parameters was followed by Bruner and Coman (1974); Moore *et al.*, (1974); Teerink (1991) and Chakraborty *et al.*, (1996).

Results and Discussion

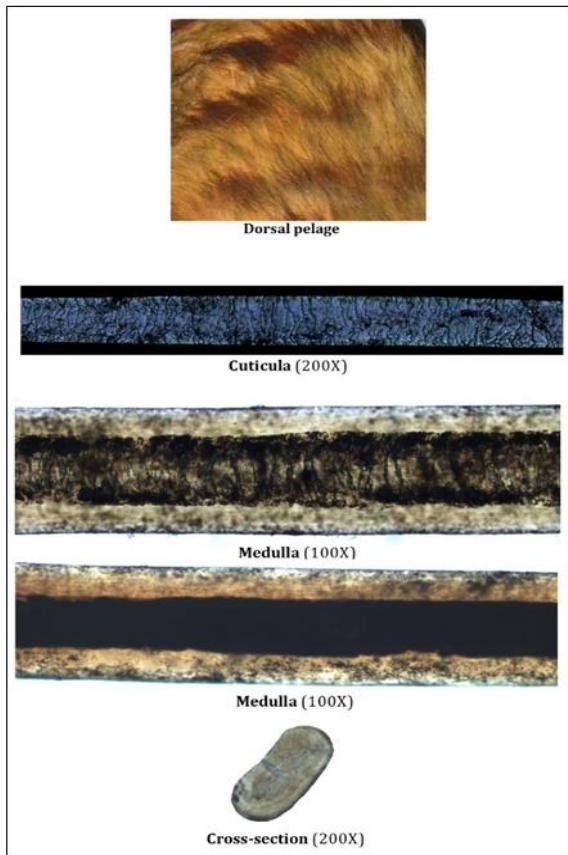
The cuticular characteristics of dorsal guard hair of *H. hyaena* were observed as: scale position- ‘transversal’, scale patterns- ‘regular wave’, the structure of scale margins- ‘smooth’ and the distance between scale margins- ‘near’. The medullary characteristics of dorsal guard hair were as: composition of medulla- ‘unicellular regular’, the structure of medulla- ‘simple or narrow medulla lattice’, and form of the medulla margins- ‘straight’. The cross-section of dorsal guard hair was observed as ‘oblong’ shape (Table 1; Figure 1).

The hair of *H. hyaena* can be identified with its unique medullary characteristics *i.e.* the composition of medulla- ‘unicellular regular’, structure of medulla- ‘simple or narrow medulla lattice’ and the ‘oblong’ shape cross-section. Although the cuticular characteristics are similar between other mammals species were studied earlier by Chakraborty and De (2010); Sarkar (2012); Kamalakannan (2015), the cuticular characters can be used as a combination of characters. There is no specific study on hair morphology of *H. hyaena* except a study Chakraborty and De (2010), in which, the surface structure of *H. hyaena* was discussed.

Table.1 Microscopic hair characteristics of *Hyaena hyaena*

a. Cuticular scale characteristics	
Scale position	Transversal
Scale patterns	Regular wave
Structure of scale margins	Smooth
Distance between scale margins	Near
b. Medullary characteristics	
Composition of medulla	Unicellular regular
Structure of medulla	Simple / Narrow medulla lattice
Margins of medulla	Straight
c. Shape of cross-section	
	Oblong

Fig.1 Photo-micrograph of dorsal guard hair characteristics of *Hyaena hyaena*



The cuticular characters, medullary configuration and cross-section of dorsal guard hair are more or less similar to observation of Chakraborty and De (2010). However, this study provides a complete combination of characters of dorsal guard hair of *H. hyaena* along with the high-resolution photo-micrographs for species identification.

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