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STRUCTURE OF MID-DORSAL GUARD HAIRS OF HUNTING LEOPARD, *ACINONYX JUBATUS VENATICUS* (GRIFFITH) AND LESSER PANDA, *AILURUS FULGENS* F. CUVIER (MAMMALIA : CARNIVORA)

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INTRODUCTION

Knowledge about the structure of dorsal guard hairs has not only become the most significant in the study of mammalian taxonomy and food habit but in the mammal survey, forensic science and control of illegal trade also (Brunner and Coman 1974, Koppiker and Sabnis 1976, 1977, Teerink 1991, Chakraborty *et al.*, 1996, 1999). Hair structure of quite a number of mammalian species of India as well as abroad have been worked out (Hausman 1920, Brunner and Coman 1974, Moore *et al.*, 1974, Koppiker and Sabnis 1976, 1977, Keller 1981, Debrot *et al.*, 1982, Teerink 1991, Wallis 1993, Venkatraman *et al.*, 1994, De and Chakraborty 1995, Chakraborty *et al.*, 1996, 1999, De *et al.*, 1998). However, no information is available as regard the structure of dorsal guard hairs of two threatened species of carnivora, *viz.*, Hunting Leopard, *Acinonyx jubatus* (Schreber) [Carnivora : Felidae] and Lesser Panda, *Ailurus fulgens* F. Cuvier (Carnivora : Ursidae). Hunting Leopard was last recorded in India in 1952 and considered as extinct in the country (Ghosh 1994), while Lesser Panda, within Indian limit, is found in Darjeeling (West Bengal), Sikkim and Arunachal Pradesh and considered as endangered (Chakraborty 1994). Both the species are included in the Schedule I of the Indian Wildlife (protection) Act, 1972. In India *A. fulgens* is represented by the nominate subspecies, while *A. jubatus* was represented by the subspecies *venaticus* (Griffith). In the present paper an attempt has been made to reveal the structure of dorsal guard hairs of the above mentioned species.

MATERIAL AND METHODS

Five tufts of guard hairs were collected from the mid-dorsal region of four dry preserved specimens of each species present in the National Zoological Collection of the Zoological Survey of India, Kolkata. Samples were processed for study according to the method of Chakraborty *et al.*, (1996). Surface structure, medullary configuration and cross sectional details of dorsal guard hairs were studied microscopically followed after Brunner and Coman (1974), Teerink (1991) and Chakraborty *et al.*, (1996).

Nomenclature of colour is followed after Ridgway (1891) and structural nomenclature of cuticular as well as medullary configuration is followed after Brunner and Coman (1974) and Moore *et al.*, (1974). Classification was followed after Wozencroft (1993).

OBSERVATIONS

1. ***Ailurus fulgens*** F. Cuvier

   A. Physical Characters :

   Colour : Basal – Cinnamon or Fawn
   Distal – Brunt Umber
   Profile : Straight, Shielded, Spatulate
   Length (mm) : 47–56 (50.4 ± 3.07)
   Diameter (μ) : Basal : 50–60 (54.5 ± 1.29)
   Subshield : 70–80 (76.3 ± 3.358)
   Shield : 110–130 (116.4 ± 2.449).

   B. Surface structure (Plate I, Fig. 1)

   Scale count (per mm of hair length) : 498–535 (522 ± 5.23)
   Scale type : Petaloid
   Scale pattern : Diamond Petal
   Scale margin : Smooth
   Scale margin distance : Distant
   Side to side scale length (SS) : 3.1–4.4μ (4 ± 0.23)
   Proximo-distal scale length (PD) : 10–14.4μ (13.12 ± 0.36).

   C. Medulla (Plate I, Fig. 2)

   Medullary configuration : Unbroken cellular
   Medullary index : 0.61–0.649 (0.63 ± 0.011).

   D. Cross section : Circular (Plate I, Fig. 3).

2. ***Acinonyx jubatus*** (Schreber)

   A. Physical characters :

   Colour : Basal – Usually Buff
   Middle – Tawny
   Tip – Brown
   Remark : Shades are greatly varied, sometimes whole hair is light Brown or dark Tawny or sometimes more darker.
   Length (mm) : 37–47 (43.7 ± 2.07)
   Profile : Very thin, straight, rod like
   Diameter (μ) : 50–65 (56 ± 3.56).

B. Surface structure (Plate II, Fig. 1)
Scale count : 435–538 (489 ± 6.38)
Scale type : Imbricate, Crenate
Scale pattern : Irregular wave
Scale margin : Irregularly Rippled
Scale margin distance : Intermediate
Side to side scale length (SS) : 7.5–21.87μ (14.81 ± 4.31)
Proximo-distal scale length (PD) : 3.12–9.39μ (5.25 ± 2.24).

C. Medulla (Plate II, Fig. 2)
Medullary configuration : Simple unbroken amorphous
Medullary index : 0.62–0.66 (0.638 ± 0.014).

D. Cross section : Almost circular (Plate II, Fig. 3)
Remark : Cuticular scales are very much irregular in shape and size.

DISCUSSION

Structure of dorsal guard hairs of all the five species of large cats of Indian territory belonging to the genus *Panthera* Oken have been studied (Chakraborty *et al.* 1996). On comparison with the species of the genus *Panthera*, it has been found that scale count in *A. jubatus* is much higher (489 ± 6.38) than that of all the five species of the genus *Panthera*, where highest is 300 in *P. tigris*. Moreover, 'SS' (14.81 ± 4.31) and 'PD' (5.25 ± 2.24) in *A. jubatus* are on average, much lower than those in the species of the genus *Panthera*, where 'SS' and 'PD' are lowest in *P. tigris* being (18 ± 6) and (7 ± 2) respectively. When compared with the hair structure of the 11 species of Indian lesser cats (Chakraborty *et al.* 1999), it has been found that hair structure of *A. jubatus* has no single characteristic by which it may be separated from all of them. However, from the combination of characters like scale count, scale structure, scale margin, scale type, medullary configuration, *A. jubatus* can be distinguished from all the species of lesser cats occurring in India.

Genus *Ailurus* is monotypic and its family placement is much controversial. It has been included under Ailuridae (Pocock 1939), Procyonidae (Ellerman and Morrison Scott 1951), Ailuropodidae (Honacki *et al.*, 1982) and Ursidae (Wozencroft 1993). On the basis of biochemical and molecular evidence, *Ailurus* was considered as intermediate between procyonids and Ursids (O'Brien *et al.* 1985, Tagle *et al.* 1986, Wayne *et al.* 1989). Todd and Pressman (1968), Zhang and Shi (1991) regarded it as closer to procyonids, while reverse opinion was held by Goldman *et al.* (1989).

Hausman (1920) observed 'Diamond Petal' scale pattern and 'Smooth' scale margin in *Ursus americanus* like *A. fulgens*, but in *Ursus arctos* scale pattern is 'Irregular wave' with 'Crenate' scale

margin. Moore *et al.* (1974) studied the hair structure of two species of Ursids *viz.*, *Ursus americanus cinnamomum*, *Ursus arctos imperator* and two species of Procyonids *viz.*, *Procyon lotor hirtus* and *Bassariscus astutus crizonensis*. On comparison of the findings of present study it has been found that *Ailurus* differs from all the four species in having the maximum diameter of hair as low as 60 μ against 153 μ, 148 μ, 154 μ and 83 μ in *U. americanus cinnamomum*, *U. arctos imperator*, *P. lotor hirtus* and *B. astutus crizonensis* respectively. Further, it has been found that medullary configuration is similar being 'Unbroken cellular' in both species of *Ursus*, *A. fulgens* and *B. astutus crizonensis*, but in *P. lotor hirtus* it is different being 'Unbroken vacuolated'

Thus, so far the hair structure is considered, genus *Ailurus* is distinct from all the studied species of Ursids and Procyonids in respect of diameter, while its medullary configuration is similar to both the Ursid species and one Procyonid species. As such, consideration of *Ailurus* as intermediate between Ursids and Procyonids (O'Brien *et al.* 1985, Tagle *et al.* 1986, Wayne *et al.* 1989), appears to be more justified.

SUMMARY

Mid-dorsal guard hairs of Hunting Leopard, *Acinonyx jubatus* (Schreber) and Lesser Panda, *Ailurus fulgens* F. Cuvier have been studied. *Acinonyx jubatus* may be distinguished from other species of large cats of the genus *Panthera* Oken by higher scale count, lower 'SS' and 'PD' *Ailurus fulgens* is distinguished from all the studied species of Ursidae and Procyonidae by higher diameter of the hair. Further, as regard hair structure it is intermediate between Ursids and Procyonids.

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