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STRUCTURE AND PATTERN OF CUTICULAR SCALES ON MID-DORSAL
GUARD HAIRS OF MARBLED CAT, *FELIS MARMORATA CHARLTONI*
GRAY (MAMMALIA : CARNIVORA : FELIDAE)

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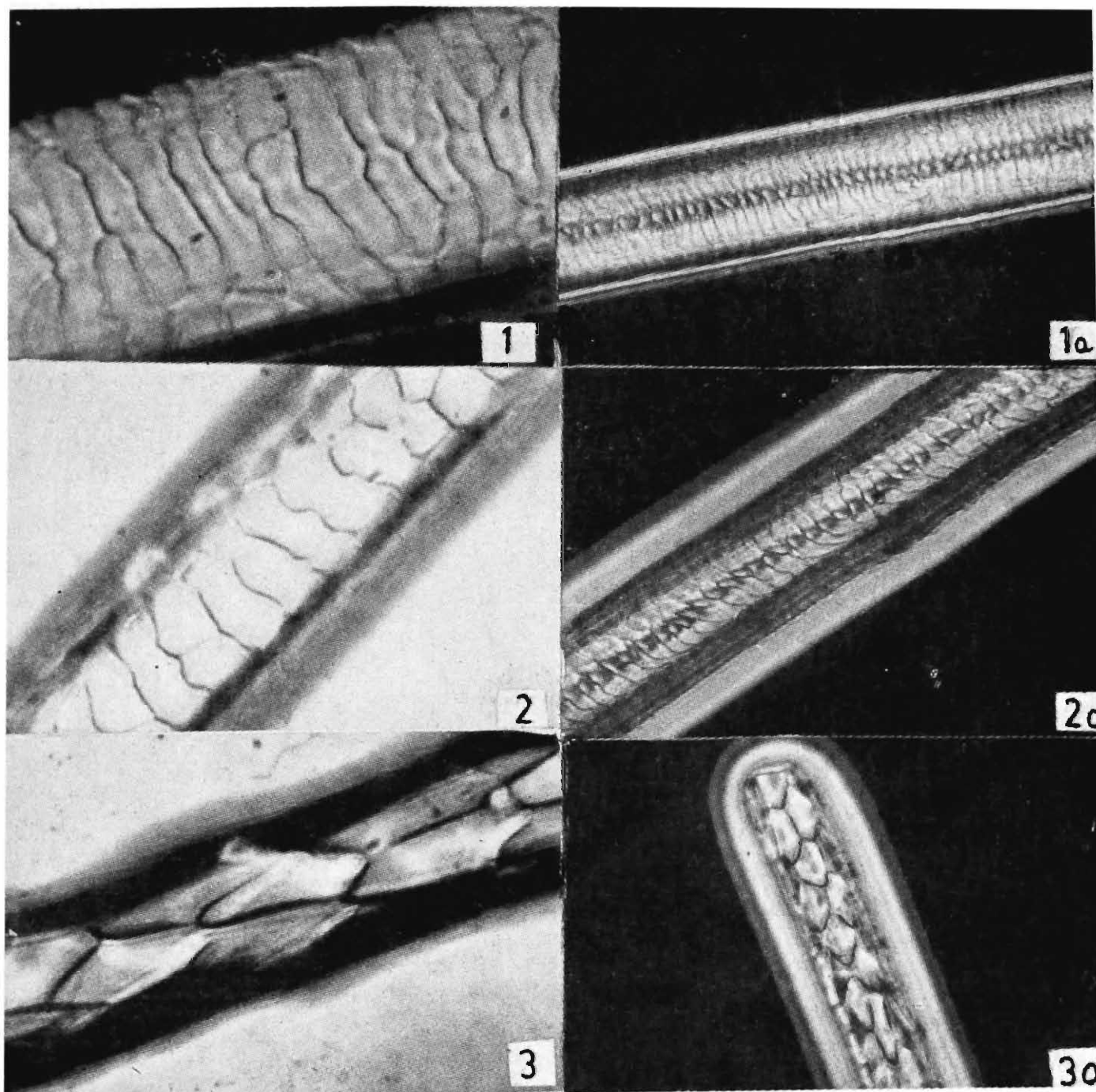
INTRODUCTION

Mid-dorsal guard hairs of Marbled cat, *Felis marmorata charltoni* Gray were studied for obtaining the structural details. Opinion differs as regard the structural stability, species-specificity of hair structure and their role in the mammalian taxonomy (Hausman 1920, Cole 1924, Mathiak 1938, Nason 1948, Lyne and McMohan 1951, Mayer 1952, Benedict 1957, Miles 1965, Day 1966, Moore *et al.* 1974, Short 1978). However, importance of hair identification in the study of food habits of carnivores (Day 1966, Koppiker and Sabnis 1976, 77), mammal survey (Adorjan and Kolenosky 1969, Dziurdzik 1973, Joshi 1976) and in forensic use (Anon 1973, Feder and Hebel 1973) cannot be ignored. For the protection of wildlife and to prevent illegal trades with wildlife products, identification of hair is also gradually becoming critical.

Though a considerable research has been carried out on the cuticular structure of hairs of extralimital mammalian species (Brunner and Coman 1974) but so far cuticular scale structure of only few Indian species have been worked out (Koppiker and Sabnis 1976, 77, De 1993).

In the present note an attempt has been made to reveal the structure, pattern of cuticular scale of mid-dorsal guard hair of marbled cat, *Felis marmorata charltoni* Gray.

The marbled cat is one of the most endangered species of lesser cats and included in the Schedule I of the Indian Wildlife (Protection) Act, 1972. Poaching for its pelt is one of the main threats to its survival (Ghose 1994).



Microphotograph of mid-dorsal guard hair of marbled cat.

Fig. 1 : Basal region 1000 X

Fig. 2 : Transitional region 1000 X

Fig. 3 : Apical region 1000 X

Fig. 1a : Basal region 400 X

Fig. 2a : Transitional region 400 X

Fig. 3a : Apical region 400 X

MATERIAL AND METHODS

Samples of guard hairs were collected from the dry preserved specimens present in the Zoological Survey of India, Calcutta. The samples have been washed in different grades of aqua-acetone solution, starting with 50 per cent and gradually raised up to pure acetone through the grades of 70, 80, 90 and 95 per cent. Washing time in each grade was 30 minutes and finally kept in pure acetone for overnight. For getting casts of cuticular scales thin film of clear varnish was drawn on the microscopic glass slide and acetone treated dry hair was put on the film with a little pressure by a fine needle. Then the film was dried for 8-10 hours. Before examining under microscope the hair sample was pulled off gently with a fine forcep leaving the casts of scales on the varnish. Slides were kept in air-tight cabinet to prevent dust accumulation.

The casts on the slides were examined under both low and high power of WILD microscope. The measurements were expressed in milimicron. Structural nomenclature was followed after Brunner and Coman (1974) and Moore *et al.* (1974). Particulars of the specimens from which the hairs were collected are given below.

ZSI Reg. No.	Locality	Sex	Date	Collector/Donor
7398	Malacca Is.	—	29 July 1895	W. Rutledge
4216	—	M	1885	W. Rutledge
7339	—	F	24 April 1893	W. Rutledge
7141	—	F	—	Donated by Zoo Garden on 18 Dec., 1889.
3982	—	—	1881	W. Rutledge

OBSERVATION

Most of the dorsal guard hairs of the marbled cat are seal brown throughout, while few with a white or cream buff patch slightly below the tip. Straight in nature with a diameter of $\pm 50\mu$ at the transitional and apical region and $\pm 30\mu$ at the basal region but tip is pointed.

Scale count varies at the different zones of the individual hair ; average count found to be 555, 164 and 89 per millimeter of hair length at the basal, transitional and apical region respectively. Zonal variations in the proximo-distal length and side to side length of the individual scale are also well marked (Table 1).

TABLE 1

Measurements of cuticular scales of the mid-dorsal guard hairs of marbled cat

	Proximo-distal length	Side to side length
Basal Region	5-10 μ (mean 5.8 μ)	7-17 μ (mean 11.8 μ)
Transitional Region	7-12 μ (mean 9.8 μ)	12.5-17 μ (mean 9.5 μ)
Apical Region	19-25 μ (mean 22 μ)	8-10 μ (mean 9.5 μ)

The pattern of scales at the basal and transitional regions are 'flat', 'regular wave' with 'smooth' margins but apical scales are almost 'diamond petals' or 'broad petals' (Plate 1). Scale margin distance is 'intermediate' at the basal region and 'distant' at the transitional region (Plate 1). In low magnification a distinct black line at the middle of the hair casts is observed in all the five specimens examined which is not found in the higher magnification (Plate 1).

DISCUSSION

Short (1978) opined that the pattern of cuticular scales on the hair surface is insufficient for identification of different mammalian species. However, from the above study it is revealed that variations in the pattern, number and measurements of cuticular scales of the dorsal guard hairs have a similar trend in all the five specimens of marbled cat examined. Thus, it appears that the number, measurements and pattern of cuticular scale revealed in the present study may be species-specific characteristics of the marbled cat. However, further studies with the cuticular scale pattern of the related species of the genus *Felis* along with the consideration of other parameters viz. cross-sectional configurations, medulla type etc. may be significant for providing key to the identification of the species.

An inverse relationship between the width of the hair and proximodistal length of each scale of guard hair obtained by Hausman (1930) and Noback (1951). However,

no such relationship could be obtained in the present study. Authors are unable to explain the black line observed on the hair casts under low magnification.

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SUMMARY

Based on the castings, structure and Pattern of cuticular scales on mid-dorsal guard hairs of marbled cat, *Felis marmorata charltoni* Gray were studied under WILD microscope. Number, shape and pattern of cuticular scales are different in the basal, transitional and apical zones of the individual hair. However, an uniformity could be marked in these respects among all the specimens studied. Cuticular scale structure and pattern may be utilised in the identification of the species.

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