

TAXONOMIC STUDY ON THE LARGE INDIAN CIVET, *VIVERRA ZIBETHA* (LINNAEUS) FROM THE INDO-BURMESE SUBREGION (MAMMALIA VIVERRIDAE)

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INTRODUCTION

The colour, texture, pattern and length of dorsal fur of the body are some of the characters on which a number of subspecies of the Large Indian Civet, *Viverra zibetha* (Linnaeus) are differentiated (Pocock, 1939). While cataloguing the collections of Viverridae present in the Zoological Survey of India, the authors had an opportunity of examining a good series of skins of *V. zibetha* from the Indo-Burmese sub-region, and faced difficulty in the subspecific identification on the basis of the characters provided by Wroughton (1915, 1918), Thomas (1927) and Pocock (1933, 1939). Hence, it was felt necessary to study this species afresh, based on the material present in the Zoological Survey of India, the Bombay Natural History Society and the data available in the extant literature. The results of this study are presented in this paper.

MATERIAL AND METHOD

All measurements are in millimetres. The external measurements were taken by the collector of specimens. However, the cranial measurements have been taken by the authors according to Pocock (1939). The colour names in the text, with initial capital letters, are according to Ridgway's (1912) nomenclature.

Material examined : NEPAL : 1 ♀ Gorkha, Satthar, 11 Jan 1923 ; 1 ♂, Gorkha, Bokarlang, 24 Nov. 1923 ; 1 ♂ no locality, 2 Apr 1921. INDIA : Sikkim : 1 ♀, Gangtok, alt, 1829m, 21 Sep 1925 ; ORISSA : Puri district : 1 ♂, Satpara, 9 Dec 1986 ; WEST BENGAL : Darjiling district ; 3 ♂, 2 ♀, Narbong, alt. 609 m, 9-13 Mar 1915 ; 1 ♂, Sivok, alt. 152 m, 22 Mar 1915 ; 1 ♀, Sungma, alt. 1372m, 18 May 1918 ; Jalpaiguri district ; 1 ♂, 1 ♀, 1 unsexed, Hansimara, 22 Feb 1913, 17 Jan 1915, 16 Jul 1915 ; 1 ♂, 1 ♀, Bharnabari, alt. 183 m, 16 Jul 1915, 23 Feb 1916 ; Maldah district : 1 ♂ (damaged skin), no locality 1870 ; Calcutta district : 2 ♂, 1 ♀, no locality, 31 May 1870, 28 Feb 1871, undated ; 1 ♀, Jadavpur, 30 Jan 1920 ; 1 ♀, Ballygunge, 24 Mar 1922 ; South 24 Parganas district : 1 ♂, Sonarpur, 9 Feb 1920. ASSAM Sibsagar district : 1 ♀, 1 unsexed, Golaghat, 15 and 20 Jan 1920 ; MEGHALAYA : Garo Hills district : 1 unsexed, Tura, 12 Mar 1920 ; Khasi Hills district :

Table 1.—Length (in mm) of hairs on crest and flank in three populations of  
*Viverra zibetha* Linnaeus

Name of subspecies and distribution	Length of crest-hairs		Length of flank-hairs	
	Winter	Summer	Winter	Summer
<i>V. z. zibetha</i> Nepal, Sikkim and Northern West Bengal	52—69 (13) 63±5	37—56 (3) 48±8	35—42 (13) 37±2	23—34 (4) 30±4
<i>V. z. picta</i> (NE India and S. West Bengal)	41—70 (21) 57.5±8.5	30—45 (9) 37±4	23—42 (21) 32±5	10—28 (9) 21±5
<i>V. z. pruinosa</i> (Tenasserim, S. Burma)	48—50 (2) 49±1	—	30—33 (2) 31±1	—

Mohinbasti c 14 km E of Nongpoh, 28 May 1949 ; Jaintia Hills district : 1 ♂, Khonsong, 21 Jul 1920. TRIPURA West Tripura district : 1 ♂, Charilam, 21 Nov 1969 ; 1 ♀, Ampri, 17 Jan 1971. South Tripura district : 1 ♂, Abhoya, 9 Dec 1969 ; Mizoram : 1 unsexed, Lushai Hills, 27 Nov 1927. BURMA : 1 unsexed. Henjada, no date ; 1 ♂, Hkamti, Upper Chindwin, 2 Aug 1914 ; 1 unsexed, Bhamo, Feb 1914 ; 1 unsexed, Ngapun, near Kindat, Dec 1913 ; 1 ♂, 1 ♀, Pyaunggaung, N. Shan States, 2 and 12 May 1913 ; 1 ♂, Monghai, north of Sandoway, Apr 1923 ; 1 unsexed, Tavoy, 14 Feb 1925 ; 1 unsexed, Little Tenasserim, 4 Feb 1915 ; 1 ♀, Tenasserim town, 12 Mar 1914.

#### OBSERVATIONS

*Nature of fur* : Dorsal hairs relatively thicker and coarser than ventral hairs; length of dorsal hairs highly variable, generally longer in winter specimens than in summer ones (Table 1) ; seasonal variation less evident in specimens from Nepal, Sikkim and West Bengal (Darjiling district). In winter specimens, hairs of crest from Tenasserim (S. Burma) relatively smaller than those from Nepal, Sikkim and northern West Bengal but fall within the range of length of crest-hairs from southern West Bengal, north-eastern India and northern Burma, thus forming a cline.

*Colour* : Colour highly variable ; dorsum ranges from pale grey, Smoke Grey, dark grey, Raw Umber, Tawny Olive to Mars Brown, and grizzled with white, buff or yellow, particularly on the sides. Hairs on chest and belly ranging from Mars Brown to Raw Umber on base and white at tip. Lower half of limbs Seal Brown. It was noted that the colour varies irrespective of locality or season.

*Body markings* : Body markings indistinct and cloudy, except on the upper half of limbs where small stripes may be present. Pattern on the head and shoulders distinct in majority of specimens (Table 2). In six out of 15 specimens from the distributional range of the nominate subspecies, pattern on shoulders feebly developed. Whitish patch on either side of the front of muzzle, and greyish patch behind it, show various degrees of development, irrespective of locality and/or season. A black spinal stripe runs from behind the shoulders to root of the tail, which in majority of specimens flanked on either side by a narrow but distinct white stripe from posterior half of the back. However, no seasonal or geographic distinctness could be noticed in this character.

Pattern on flanks highly variable, distinct in 50-67% of the summer-specimens and 0-40% of the winter ones of the different localities (Table 2).

Tail encircled with white and black rings, the latter much broader than the former ; white rings vary from 5 to 9, usually 6 in number ; first one being

Table 2—Colour-pattern on head and shoulders, and flanks in three populations *Viverra zibetba* Linnaeus

Name of Subspecies	Pattern on head and shoulders				Pattern on flanks			
	Distinct	Winter Poorly developed	Distinct	Summer Poorly developed	Distinct	Winter Poorly developed	Distinct	Winter Poorly developed
<i>V. z. zibetha</i>	6	5	3	1	2	9	2	2
<i>V. z. picta</i>	17	—	4	1	5	12	4	2
<i>V. z. pruinosa</i>	2	—	—	—	—	2	—	—

incomplete dorsally in all the specimens; second, third, fourth and fifth being incomplete in two, one, two and one specimens respectively.

**Skull-structure:** Author's observations agree with the description given by Pocock (1939) for the genus *Viverra*, and found more or less similar for all three subspecies of *V. zibetha*. However, it was noted that the posterior margin of palate varies individually, straight or semi-circular, and smooth, serrated or medially indented. Similarly, structure of auditory region varies from specimen to specimen. In one specimen each from Pyaunggaung and Hkamti (N. Burma), Golaghat (Assam) and Charilam (Tripura), zygomatic arch was found to be poorly developed and narrow (zygomatic width less than 46% of greatest length of skull). In other specimens Zygomatic arch is well-developed (48%-53% of GL), irrespective of geographical distribution (Table 3).

#### DISCUSSION

Linnaeus (1758) described the species *Viverra zibetha* from Bengal (probably present northern West Bengal), without mentioning the exact locality. Later, Wroughton (1915) described two subspecies, namely *V. z. picta* from upper Chindwin, northern Burma, on the basis of distinct markings on the body, and *V. z. pruinosa* from Tenasserim, southern Burma, by the absence of yellow tinge in the ground colour of the body and presence of white-tipped hairs. Three years later, based on the study of additional material, Wroughton (1918) remarked that the distinctness of the pattern is not a racial character. Hence, he withdrew the name *picta*, and relegated it to the synonymy of *V. z. zibetha*. Pocock (1933) on examination of a number of skins collected during winter noticed that the pattern on shoulder is more distinct in specimens from Assam, Meghalaya and Nagaland than those from Sikkim and northern West Bengal, and he resurrected the subspecies *picta*. He also maintained *pruinosa* on the basis of the fur being short, and pattern on the body distinct in winter specimens.

The present study of material from the geographical ranges of *zibetha*, *picta* and *pruinosa* reveals that the differences in coat-colour and the pattern on shoulders and flanks in all the three populations vary from specimen to specimen (Table 2), hence appear to be of no systematic value. As regards the length of fur, it is definitely shorter in two winter specimens from southern Burma than in specimens from Nepal, Sikkim and northern West Bengal, but are well within the range of length of fur from other localities (Table 1). Moreover, the sample-size from southern Burma is too small to come to any conclusion as to the shortness of the fur. Lekagul and McNeely (1977) although maintained the subspecies *picta* and *pruinosa* on the basis of material present in Thailand, but regarded them as poorly differentiated.

Table 3.—Measurements of body and skull (in mm) in different populations of *Viverra zibetha* (Linnaeus) with range, mean and standard deviation. Sample size in parenthesis.

Name of subspecies and distribution	Head & body	Tail	Hindfoot	Greatest length	Zygomatic width
<i>V. z. zibetha</i>	635-810 (15)	310-457 (14)	103-135 (15)	133-145 (8)	64.0-70.7 (6)
(Nepal, Sikkim, N. West Bengal)	741+33	394+45	123+9	140+4	67.8+2.0
<i>V. z. picta</i>	634-865 (19)	333-490 (19)	95-140 (19)	132-145 (12)	61.0-72.8 (9)
(North eastern India and S. West Bengal)	783+63	421+41	126+11	137.2+2.8	65.2+3.0
<i>V. z. pruinosa</i>	770-795 (2)	430-435 (2)	125-130 (2)	134-156 (4)	73.0 (1)
(Tenasserim. S. Burma)	782+12	432+2	127+2	143+8	

An analysis of the various measurements of the body and skull from different subspecific zones of the Indo-Burmese subregion reveals that there is no significant difference between them in any of the body and skull measurements (Table 3). The structure of the posterior margin of palate, auditory region and the zygomatic arch though differ to a certain extent, but are of no systematic importance because they vary from specimen to specimen.

Hence, in authors' opinion, the separation of *picta* and *pruinosa* from *zibetha* is taxonomically not justified. It would be appropriate to treat *Viverra zibetha picta* and *Viverra zibetha pruinosa* as synonyms of the nominate subspecies. Since the authors could not examine the specimens of another subspecies, *V z. ashtoni*, from southern China due to non-availability of the material, they are not in a position to comment on the status of that subspecies. However, according to Pocock (1939, footnote on page 351) the southern Chinese race has longer coat. A winter specimen has crest and flank-hairs about 90 and 50 mm long respectively.

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