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TECHNIQUE TO DISTINGUISH TRACKS OF LEOPARD AND TIGER CUB

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Introduction

Shankhala (1977) stated that the pug mark of an adult leopard is smaller than that of the smallest tiger cub which may trail the mother. Panwar (1979) mentioned that the minimum age at which the tiger cub comes out to the open with its mother is six months. The manual of Wildlife Techniques for India (Sale and Berkmuller, 1988) have not added anything further to the above knowledge, while it was already established (R K. Rao and K.G.M Pillai, Pers. Comm., 1982) by the wildlife trainee-officers at the erstwhile Central Crocodile Breeding and Management Training Institute, Hyderabad, from a study on captive animals at the Nehru Zoological Park, that 'the maximum length of the hind pug mark of an adult leopard is 9 cm and this is smaller than the mark of a tiger cub which accompanies the mother at six months age'. At the recently concluded Workshop on Research in Tiger Reserves (1989) at Kanha National Park, we (authors) mentioned that the stride of a leopard adult is longer than that of a tiger cub with a pug mark of equal length.

In Similipal, prior to 1989, during pug-mark-based census of tigers & leopard the standard thumb rule in practice was that 'if an approximately 9 cm long cat pug mark was accompanied with an adult female cat's pug mark, around or above 12 cm long, the smaller pug mark was that of young tiger. When the pug mark of a mother tiger was not there the smaller pug mark was concluded to be that of a leopard'.

While applying the above 'thumb rule' we were led to confusion when there were multiple tracks and when inspite of our otherwise sure knowlegde, we were bent upon to conclude a pug mark to be of a leopard only because the mother tiger's pug marks were not close by.

In this work we have presented data from our 1989 tiger census and have shown that stride measurements can, in adjunct to the existing knowledge, distinguish the track of a leopard and a tiger cub with greater level of confidence than we do at present. We also recognise that there is a need to study in greater details the tracks and signs of large cats and lesser cats in order to perfect the existing technique still further of pug-mark-based census of tigers and leopards.

Method

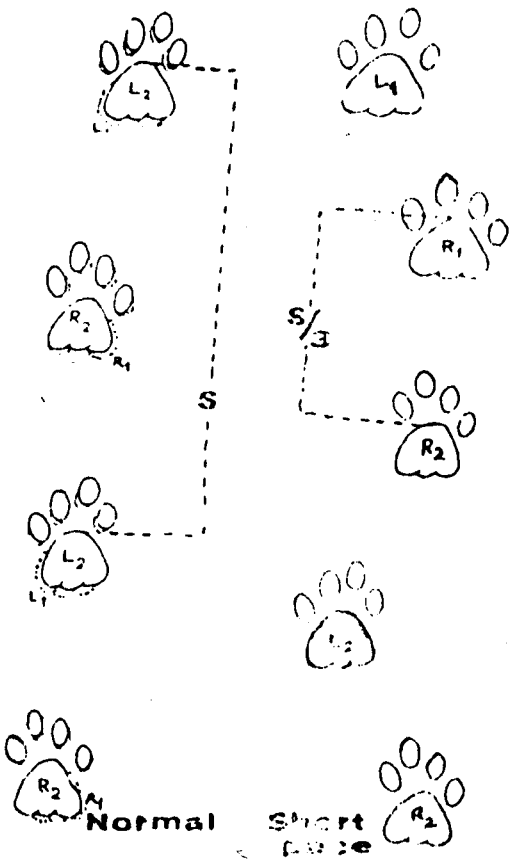
Pad-impression-pad or pug-impression-pad, commonly called PIP are used in Similipal to register tracks of large cats during the census period because of hard surface of animal tracks or roads. The concept was first described by Choudhury (1971). Later modifications also prescribed by Choudhury and adopted even these days

described the PIP as a specially prepared well grounded powdery dust of thickness 20-30 mm along main roads, exraction paths, foot paths and animal tracks etc. The soil is removed by at least 20-30 mm deep from an area covering the entire width of the road or track and extending along the linear direction by usually 2 m, and never less than 1 5 m. This area is then filled up with well grounded fine earth sieved through a 'mosquito wire-mesh'.

During our day-to-day monitoring of the tracks and during census operation in Jan. 1989, we recorded the stride measurements of the large cats. For normal walk the stride is the distance from the top end of a left hind pad to the top end of another impression of the left hind pad (Fig. 1) This provided the stride L-L (Left to Left). When this exact measurement was not clear we have considered any of the other data available from R-R, L-R or R-L, i.e right to right, left to right or right to left, respectively Stride R-R was taken to be equal to L-L Measurements of R-L or L-R were multiplied by '2' to get the actual stride. When the animal performed 'short pace' gait (Choudhury, 1971) (Fig. 1), there were no superimposition of the hind pug mark on the front pug mark and the series appeared different and even difficult to convert to a normal stride. In order to standardise the approach we have multiplied the measurement taken from two adjacent pug impressions by '3' if the measurement was less than 30 cm and the figure so obtained has been considered to be an approximate measurement of the stride.

The length of a pug mark was measured as per the standard practice. From the mean axis of movement, known from direction of the pug mark, two parallel lines were drawn, one touching the base of the pad and the other touching the tip of the longest toe The distance between these two lines gave the length of the pug mark.

Fig. 1

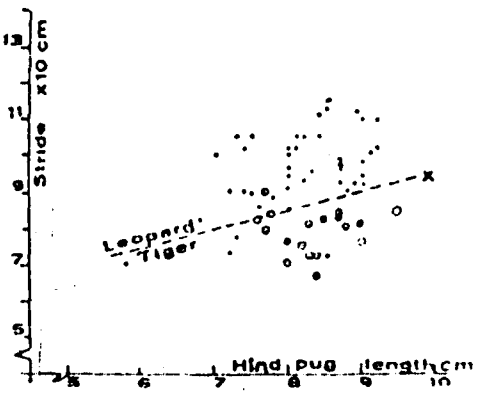


Tracks during normal walk and short-pacing gait (Choudhury 1971) showing the measurement of stride (S) considered for analysis in the present study. L and R represent left and right pug marks, respectively. 1 and 2 show the front and hind pugs, respectively. S/3 shows one third of a normal stride.

Results

There were a total of 60 measurements which we considered to be either of a leopard or a young tiger, irrespective of whether or not adult tigeress' tracks were in the adjacent. These measurements were plotted on a graph (Fig. 2). Line 'X' showed the approximate level at which the points for leopard and young tiger appeared separated. Eighteen of the measurements were concluded to be for tiger and the others for leopard (Fig. 2, Table 1).

Fig. 2



The relationship between stride and the length of hind pug mark. The data were collected without actually knowing to which animal these belong. On plotting the graph the points distinctly clump on either side of the line 'X' to suggest a separation in the biometrics for leopard and young tigers.

1. The maximum length of the pug mark of an adult leopard in Similipal is more than 9.0 cm.

2. The length of the pug mark of most leopards and most young tigers were between 8.0 and 9.0 cm.

3. The stride of leopards were approximately 90–110 cm.

4. The stride of young tigers were approximately 70–85 cm.

Discussion

The tiger habitat in Similipal is considered to be more dense with more ground cover. Since a few of the tiger pug marks were smaller than 8.0 cm, it is presumed that in Similipal the tiger cubs may be coming out with the mother a little earlier than six months.

The method described here is to be used only in adjunct to the prevailing knowledge about the minimum and maximum sizes of the pugs of leopard and tiger cub. In the absence of a normal stride it is necessary to distinguish the type of gait performed (Choudhury, 1971) (Fig. 1). The interpretation will be more difficult if the data have been collected by one who has not received adequate excercise in the subject.

Nevertheless, the advantages of the technique described are in the fact that at the moment of confusion, even an indicative stride will solve the problem. For an easy field reference, it may be accepted that, for a 9 cm long pug mark if the stride is more than 90 cm, it is that of an adult leopard. In a situation otherwise that is, if the stride is smaller than 90 cm, the track is that of a young tiger.

Table 1

Size of pug mark and stride measurements (cm) of Leopards and tiger cubs. The entries under reference to show Range Name/Census Unit/Animal No./Tracing page.

Ref. No.	Pug mark Length	Pug mark Breadth	Stride	Whether leopard or Tiger (L or T)	Presence of track of tigers nearby
1	2		3	4	5
U/ 1/B/ 1	8.3	7.8	81	T	12.8 × 10.7
U/ 1/4/ 22	7.8	6.5	84	T	13.1 × 11.0
U/ 2/C/ 38	8.3	8.0	72	T	14.1 × 11.5
U/ 3/A/ 58	9.0	8.0	76	T	
U/ 4/A/ 68	9.0	7.6	81	T	
U/ 6/C/ 89	8.7	7.5	84	T	13.4 × 10.8
U/ 8/D/134	8.4	7.7	72	T	13.0 × 11.1
U/10/B/154	8.0	7.0	76	T	13.1 × 11.4
U/11/D/165	7.7	7.0	79	T	12.9 × 10.1
U/13/B/186	8.7	7.7	83	T	13.3 × 11.4
C/ 2/B/ 13	8.5	7.4	82	T	11.6 × 9.9
C/ 4/B/ 40	8.4	7.5	66	T	12.2 × 10.3
C/ 4/D/ 44	8.0	7.3	70	T	13.6 × 9.7
N/ 3/C/ 20	7.6	7.3	82	T	
N/ 6/B/ 37	8.0	7.2	88	T	
N/ 9/A/ 61	9.5	8.8	84	T	14.0 × 11.7
N/ 9/B/ 62	8.2	6.5	75	T	14.0 × 11.7
C/ 3/B/ 25	7.7	7.4	90	T	12.2 × 9.5
U/ 1/D/ 6	8.1	7.6	105	L	12.8 × 10.7
U/ 1/E/ 24	8.2	5.7	93	L	12.8 × 10.7
U/ 1/I / 12	8.4	8.0	105	L	13.1 × 11.0
U/ 1/J / 28	9.2	8.1	110	L	14.1 × 11.5
U/ 1/K/ 26	8.2	7.0	105	L	
U/ 2/D/ 39	7.2	6.6	90	L	
U/ 2/E/ 43A	8.0	7.6	102	L	14.1 × 11.5
U/ 2/F / 47	8.7	7.8	92	L	
U/ 3/C/ 49	9.0	8.2	94	L	
U/ 5/D/ 82	8.1	7.0	102	L	
U/ 7/D/ 99	7.9	6.3	88	L	14.2 × 12.5
U/ 7/I /111	7.5	7.4	89	L	

(*Contd.*)

1	2		3	4	5
U/ 7/G/108	8.7	7.7	96	L	
U/ 7/H/109	7.0	6.2	100	L	
U/ 9/B/144	9.2	8.0	102	L	
U/ 9/C/147	7.3	7.1	77	L	
U/10/D/150	8 9	7.3	92	L	
U/10/E/156	8.8	8.5	90	L	
U/10/F/159	6.8	5.6	82	L	
U/12/A/176	8.0	8.0	91	L	
U/13/D/180	8.5	7.2	115	L	
U/13/E/185	7.4	7.0	102	L	
U/14/B/191	9 1	8.1	100	L	
U/14/C/194	8.7	8.2	96	L	
U/15/B/200	8 0	6.3	94	L	
N/ 2/E/ 18	7.2	6.0	73	L	13.0 × 11.1
N/ 4/A/ 32	8 0	6.2	96	L	12.0 × 10.0
N/ 4/C/ 27	5 8	5.4	70	L	
N/ 4/D/ 28	7 4	6.6	90	L	
N/ 8/B/ 60	8.3	7.0	95	L	
P/ 1/B/ 6	8.0	6.1	100	L	
C/ 1/B/ 3	7.6	6.9	86	L	13 0 × 11.0
C/ 1/D/ 11	7.3	5.6	105	L	
C/ 2/D/ 14	8.5	7.5	113	L	11.6 × 9.9
C/ 3/E/ 33	8.4	8.4	111	L	
C/ 3/F/ 29	9.9	8.5	92	L	
C/ 4/F/ 42	9.0	8.0	98	L	
C/ 5/E/ 55	9.0	7.7	110	L	13.3 × 11.2
C/ 5/F/ 57	8.0	6.4	85	L	12.2 × 9.5
C/ 5/G/ 58	8 5	6 9	72	L	
C/ 6/C/ 64	8 9	7.7	112	L	
J/ 2/C/ 8	7.5	6 3	105	L	

Acknowledgements

We wish to express our thanks to the Principal Chief Conservator of Forests, Orissa, and the Chief Wildlife Warden, Orissa for the scope given by them for the present study. We also thank all our field staff who have not only collected the data for this work but have also used this technique and found it useful. We record special thanks to Shri R.R. Nayak and Shri K.C. Hansda, Wildlife Wardens who were instrumental in imparting training to the field staff before 1989 census and remained associated with this study.

SUMMARY

The stride of a large cat in its normal walk is the distance from the tip of the impression of the pad of a hind limb to the corresponding position at an adjacent impression of the same pug The stride is also approximately twice the distance between two adjacent pug marks, that of the left and right hind limbs during normal walk, and approximately thrice during a short pace gait. It is concluded from the present study that the strides of adult leopard were mostly above 90 cm while that of young tigers were 70-85 cm. These observations have formed the basis to distinguish the tracks of a leopard and a young tiger, both of which may have a pug mark length of 8-9 cm.

तेंदुए और बाघ के शावकों के पदचिह्नों में अन्तर करने की प्रविधि

एस॰ आर॰ सागर व एल॰ ए॰ के॰ सिंह

सारांश

बड़े बिडाल की सामान्य चाल में कदम का अर्थ उस दूरी से है जो पिछले पैर की गद्दी से बने निशान की नोक से उसी स्थिति में उसी पैर से बने अगले निशान के बीच रहती है। यह कदम पास-पास बने पदचिह्नों अर्थात् सामान्य चाल में बांय और दांए पिछले पैरों के निशानों के बीच की दूरी से दुगुना और मन्द गति में छोटा कदम चलने पर बने निशानों की दूरी से लगभग तिगुना होती है। वर्तमान अध्ययन से यह निष्कर्ष निकला है कि वयस्क तेन्दुए का कदम अधिकतर 90 सेमी॰ से अधिक होता है। छोटे बाघों का पग 70-85 सेमी॰ का होता है। इन पर्यवेक्षणों से हमें तेन्दुए और छोटे बाघों के पदचिह्नों का अन्तर पहचानने का आधार मिलता है क्योंकि दोनों के पद का निशान 8-9 सेमी॰ का हो सकता है।

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