

Discussion based on power-point presentation at the Seminar:

“Wildlife in the wake of the third millennium”

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IMPROVED APPROACH TO TIGER COUNTING THROUGH PUGMARKS

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Introduction

For success in conservation, researched data on population status provide the required base for concern and direction. In 1971, opinion was unanimous that tiger population had drastically gone down within seventy years of the 20th century. Based on shikar information and wise speculations the number 40,000 denoted the population of tiger that existed at the beginning of the last century. Hereafter, it was necessary to provide the correct status and trend of the population as a measure to status of conservation actions.

Understandably, there is no scope to enumerate tigers by direct count. We all know that tiger-sighting is heavily dependent on ‘luck’, and that before we see the tiger once the tiger would have seen us a hundred times. Yet, we know of evidences that speak about the presence of tiger. Some of the main evidences include kills, scat, pugmark, ground-scratches, tree-scratches etc. Among all these field evidences, pugmarks are the most common, most revealing and the easiest to use, verify and interpret to produce reliable information on minimum number of tigers. Therefore, during the last 27 years it has been important to correctly track all surviving tigers.

Champion to Choudhury (1929-1970)

Animal tracking is a very old skill that developed through various stages of human civilisation when people competed for space and resource with various forms of wildlife. Hunters had to study tracks to hunt or to save their own life. Farmers tracked to identify species damaging crops and devise methods of protecting the crop from pests. Naturalists have tracked animals as a scientific pursuit.

F. W. Champion was one such great naturalist who tracked animals in India and elsewhere and gave two techniques for study of tigers as long back as 1920s. One was tracking the pugmarks and the other was using trip-wire flash to photograph nocturnal behaviour of animals including tiger (Champion, 1929).

Three years before the launching of Project Tiger S. R. Choudhury provided the design of a Tracer to freeze tiger pugmark on the ground as a sketch that can be carried from the field to a laboratory for storage, analysis and retrieval (Choudhury, 1970b).

The first twenty years (1970-1990)

The first All India Census of Tigers was conducted in summer, 1972 using Choudhury's method of Cooperation Tiger Census with the Tiger Tracer (Choudhury, 1970a, 1972). The method has been in use since then but not without national and international doubts on figures of tiger population.

Mr. Paul Leyhausen had enquired in 1976 if Mr. S. R. Choudhury would 'honestly confirm the impeccable quality of the Tiger Tracer as so much univocally stated everywhere he had gone round with the foresters in this country' (Choudhury, 1979). The doubts were cleared and Tiger Tracer continued to remain as the simple equipment that translated field evidences into figures on tiger population status.

Again, in 1990s, a fresh spate of doubts was raised about the number of tigers in India. In the process, the technique of Pugmark Tracking was attacked in the media. From Similipal Tiger Reserve, we had sent our reflections to appropriate places but these had apparently not impressed anyone.

At this juncture, in 1996 I was asked by WWF – Tiger Conservation Programme if I could prepare a set of guidelines for pugmark tracking so that it is dependable and can be used all over the country. Many people in India and outside it critically examined the drafts and finally it is in an acceptable format, although improvement is still possible (Singh, 2000).

Reasons for criticisms

Pugmark Technique is a reasonably sound technique and the reason for its criticism were sometimes genuine but there were a few avoidable situations that created scope for criticism. Some of the situations were as follows.

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The entire subject of wildlife management and techniques were new and confined to a few individuals at a higher hierarchy.

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Clarifications about criticisms could not reach field level staff, or the clarifications were not audible.

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In some instances some of the field workers were not clear about the concept.

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The language of procedure for data collection and analysis were not made simple and interesting (for eg., distinction of left/right; front/hind, male/female).

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Transparency of the technique was not audible or visible.

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Human/managerial urge to present an "all is well picture"

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Attempts to interpret pugmark tracings or plaster casts even though the interpreter was inadequately equipped with the technique, and had inadequate supportive field information.

Subjects of Main Criticisms and Recent Improvements.

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Population growth rate presented in the initial years—and its harmony with natality/mortality of tigers.

After about ten years of Project Tiger it was seen that the tiger population had increased in almost all habitats. This situation was viewed with suspicion and it was argued that the population estimates were not correct.

However, now it is agreed that it is indeed possible to achieve whatever the population growth rate has been. Tiger and its habitat responded well to stringent protection measures and habitat manipulation practices during the first 10-15 years. The situation is stabilising in most areas in the face of competition with human populations for space and resource.

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Claim that from pugmark technique, we are identifying individual tigers.

It has often been claimed that we always identify all individual tigers from pugmarks.

This claim is a little premature and needs to be properly explained. In fact, such identification of individuals is necessary only in a limited number of instances. It is necessary to establish the identity of two tigers if they have pugmarks of equal size and obtained from two adjoining census units. It is not necessary to establish individual identity of two tigers that had moved on the same day at places separated by other tiger territories. Where separate identity is not distinct, it is always safe to state the two evidences belonging to one tiger. Moreover, we are aiming to arrive at the minimum size of the tiger population.

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Pugmarks varying on different ground conditions.

Pugmark impressions vary in depth, size and clarity depending on ground conditions. Therefore, soil-conditions have to be taken into account and the actual tracing of the pugmark has to be determined.

Pug Impression Pads (PIPs) with about 1cm layer of fine dust of soil provide a very stable and uniform ground condition. However, when pugmarks are obtained from deeper soil or mud we have to judge the contour along which the original pug may have been placed. It is usually the middle line the upper and lower levels of the pugmark impression. The pugmark is then drawn along the middle line. This is also possible if a plaster cast is brought from the field to the analysis room.

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Tracings varying from person to person.

It is true that field staff of Forest Departments does tiger tracking and pugmark tracings. The staff is often only literate about the wildlife but are not always good at tracings.

Therefore, it is now emphasised that even if the staff brings a Tracing, he should bring a plaster cast. From the plaster cast we can retrace a pugmark to bring in quality and uniformity.

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Interpretation varying from person to person.

The most commonly cited criticism is about an experiment where a selected few individuals were asked to determine the number of tigers from a particular number of plaster casts. It is said that different individuals gave different results.

The above situation arose because field data and analysis were incomplete. It is always necessary that information about field conditions and movement of tiger have to be there to aid in analysis. These aspects have been taken care of in a prescribed Format (Form-D: Singh, 2000).

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Underestimation of number of cubs.

People often question about the natality rates and the number of tiger cubs identified during census.

It is true that at the present level of understanding of the pugmark technique we are able to identify usually only one, rarely upto three cubs. Therefore, the number of tiger cubs is underestimated. Nonetheless, as stated elsewhere, the objective is to present the minimum size of the tiger population through pugmark tracking.

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Distinction of male female: the square vs. rectangular look.

Male and female tigers are distinguished on the basis of quadrangle into which their hind pugmark may fit. The contention had been that if the pugmark fits into a square it is male otherwise it is a female. Since it is a rare event to have a perfect biological square, there had been arguments about sex-interpretation.

Recently, a ready-to-use Table has been prepared identify sex if dimensions of hind pugmark length and width are known. It has also been possible to identify sex from the front pugmark.

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Distinction of tracks of Tiger cub and leopard adult.

Association of mother and cub may not be always clear in the field. Again, the size of the pugmark of tiger cubs and adult leopard is almost the same but they differ in proportionate size of the toes and their arrangement. But this required experience.

Now, an additional aspect of stride is being considered to aid in analysis.

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Inadequate awareness about the significance attached to population figures.

This situation, if it was there, has definitely changed due to criticisms in the media, better standardisation of the technique and introduction of training to staff at all levels. The change is now evident from tiger population figures from different parts of the country.

Improvements Made since 1990.

A number of aspects of the pugmark technique has been improved since 1990. Broadly, these aspects relate to the following. (1) Clarity and Transparency has been introduced through non-official participation. (2) Simplification of the procedure has been made to make it intelligible to all field level staff. (3) There is now adequate verifiability through laying of PIP (Pug Impression Pads). (4) Standardisation have been made of (a) Season / unit / route/ PIP, (b) Data collection procedure, (c) Training need, (d) Analysis procedure, and (e) Data presentation. (5) There is availability of the entire procedure in print in English and Hindi. (6) Ongoing process to make available illustrated Pocket Books for field level workers. (7) A beginning has also been made to make available the procedure in local language. It is now already there in Oriya. (8) An experimental approach has been made to develop a video film in Oriya for use during training. (9) Printed materials have been produced in various forms like Trainers Reference Sheets, Tracking guideline and Pictorial Field Guide for FG.

Subjects for further research

With every passing year the level of understanding of the Pugmark Technique is improving. Yet there are a number of other aspects that need further research to refine the technique. It may also require site-specific refinements. (1) Avoid underestimation of tiger cubs, (2) Develop technique to distinguish leopard cubs and lesser cats, (3) Improve over the present under-coverage of area.

Significance of Pugmark Technique

If well practiced, Pugmark technique can lead us to (a) Identify species, (b) Identify sex, (c) Identify major age class (population composition), (d) Link male-female// mother-cub, (e) develop maps showing territorial distribution and movement areas. These are all aspect of tiger's population dynamics and biology. (f) Apart from all these, pugmark technique provides a good scope for local employment generation and protection to a traditional skill.

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