

Cannibalism in Royal Bengal Tiger (*Panthera tigris tigris*) (Linnaeus)-evidence from DNA analysis.

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Abstract

Cannibalism, the process of consuming an individual of its own species, has been exhibited by various animals with some eating the adult animals of the same kind while in the other cases even their offsprings for their survival. This paper documents cannibalism amongst tiger *Panthera tigris tigris* through scientific analysis of a scat sample collected from the Sathyamangalam Forest Division of Tamil Nadu, Southern India. DNA analysis of the nails found in the scat showed that they belonged to a male tiger cub, strongly supporting the existence of cannibalism in tiger.

Keywords: cannibalism, DNA analysis, *Panthera tigris*, Sathyamangalam, tiger

INTRODUCTION

The tiger (*Panthera tigris*), a highly endangered and charismatic species, plays a major role in the forest ecosystem as a “Flagship Species” (Karanth and Nichols 2000). There were about 6000-8000 numbers surviving in the wild by early nineties (Nowak, 1991). According to Sunquist and Shah (1997), India supported the largest numbers of tigers in the wild, approximately two thirds of the world’s tiger population. However, the recent census data revealed that the number of tigers has got reduced alarmingly from 3642 individuals at the start of this century (2001-02) to 1411 individuals now (2008-09) (Gopal, 2009). In Tamil Nadu, a southern state of India, the long-term survival of tiger is promising in its major landscapes such as Nilgiris, Eastern Ghats, Anaimalai Hills and Ashambu Hills. Ironically the Tiger population and its habitat is studied meticulously only in project tiger reserves but not in reserve forest divisions though they have considerable number of tigers. Although many scientists and naturalists have suspected cannibalism behaviour in tigers, none of them proved it through a strong scientific analysis. This article reports an evidence for cannibalism in tigers at Sathyamangalam forest division in Tamil Nadu through DNA analysis of claws from a tiger scat.

STUDY AREA

The scat sample was collected from the Hasanur Range, Sathyamangalam Forest Division of Tamilnadu, South India.(Fig. 1). It lies between 11°29'-11°8' north and 76°50'-77°27' south. The forest division harbours sizable number of elephants (Source: Project Elephant Perspective Plan for 2003 to 2013, Govt. of India). This

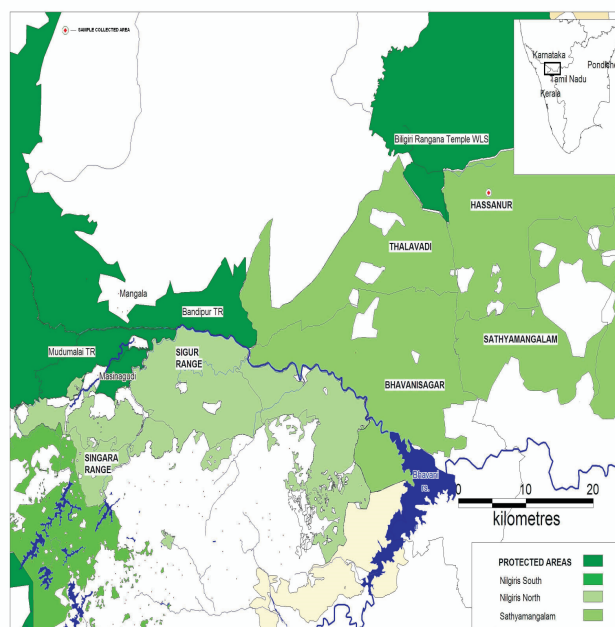


Figure 1. The Hasanur Range, Sathyamangalam Forest Division, Tamil Nadu, Southern India

forest division is surrounded in the west by Nilgiri North Division, east side by Erode Forest Division, north by Biligirirangan hills and in the south by Coimbatore Forest Division.

MATERIALS AND METHODS

We collected four nails from a tiger scat seen on a foot path at a “Manikkal” of the Hasanur Range, Sathyamangalam Forest Division, Tamil Nadu, Southern India (Fig. 1) on 8th August 2009. Out of four nails, two were sent to the Centre for Cellular and

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Molecular Biology (CCMB) Hyderabad, South India for DNA analysis.

DNA Analysis

DNA was isolated from the nail samples (n=2) as per the standard protocol and subjected to PCR amplification using the tiger specific mcb primers (Bhagavatula and Singh, 2006) to generate the species-specific molecular signature. The standard procedure described in the paper mentioned above was followed to establish the identity of biological material.

Sex Identification

In addition the nail sample was analyzed for sex identification by following Pilgrim *et al.* (2005) and Bhagavatula and Singh (2006).

RESULTS

The PCR product using the tiger-specific primers conducted on the two nail samples revealed that one of them was of tiger origin (Fig. 2). Further more the tiger positive sample was found to be of a male animal. Therefore it is concluded that the source of the DNA isolated from nail samples is of tiger origin (*Panthera tigris*) and from a male animal (Fig 2).

DISCUSSION

Sankhala (2005) mentioned that there was no substantiated record of tigresses eating their young, although both cats and lionesses do this. When he read a report from Bristol Zoo that a white tigress had eaten her cub, he could not confirm the small bones and hairs found in the faeces belonged to the cub of a tiger due to lack of scientific technology during those days. During his tenure at the zoo, he found infant's hair in the tigresses' faeces and convinced himself that it could be due to the constant licking of the cubs by the mother and naturally some of the hairs could be passed to tigresses' faeces. Sankhala (2005) also observed a dead cub left beside the mother was ignored although she was hungry. Thus he concluded that it is difficult to confirm cannibalism by seeing hairs in the scat samples of tigers.



Figure 2. Nails collected from the tiger scat

However, Sankhala (2005) cited cases reported by others where tigers shot in the early hours of the night were eaten by a tiger arriving at the bait later (Personal communications Pillai, 1954; Roongta, 1962; Debroy, 1976). Further more there were well confirmed earlier reports of killing and eating conspecifics by tiger. Willoughby (1948) had seen seven tigers started tearing one tiger which he shot near Mukkurthy peak at Nilgiris, South India. He also observed out of the two tigers that he shot, one was half eaten (lower half) and the other was completely eaten except for 4 pads and one side of the head. His conclusion was based on the tiger footprints around the carcasses. Sanderson (1907) stated that on one occasion three tigers jointly devoured the fourth one and in another occasion a live tigress had been devoured half by another tiger.

Rathore and Thaper(2000) on a tragic day in 1980's found that three nine month old cubs were killed by a territorial male tiger in an adjacent forest tract of Ranthambore Tiger Reserve. Thaper (2007) stated that new males often kill cubs in order to bring the female back into estrus, enabling a newcomer to mate with her and sire cubs of his own. He also stated that given the chance, the new males will kill small cubs of both sexes; however, once they are about a year old he seems to tolerate the females, perhaps viewing them as future reproductive partners, whereas he will kill the males, whom he presumably sees as potential rivals.

Eventhough the above reports were controversial about the cannibalistic behaviour of tiger, results of the present study clearly established the occurrence of cannibalism in tiger.

CONCLUSION

Our findings authentically confirm the occurrence of cannibalism in tiger. However, we need to account for intraspecific interactions between various age-

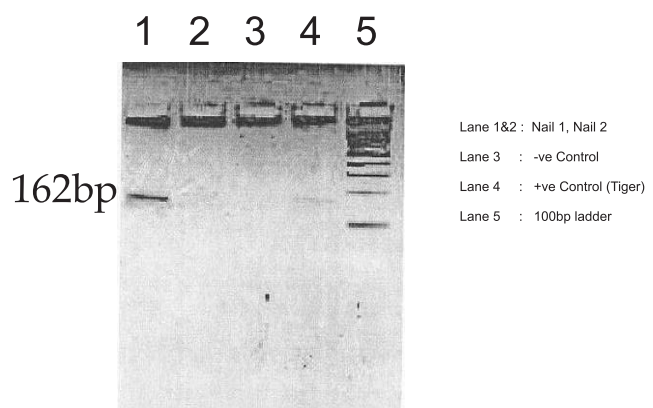


Figure 3. Tiger specific PCR amplification with nail samples and positive sample

structures if we want to make reliable predictions on how cannibalism affects the population. To date, most data on tiger studies simply record the number of individuals. Yet, there is increasing evidence that we need data on the sex, age-structure and their interactions within a population. Incorporating these information would greatly improve our understanding of how differences in life histories and intra-specific interactions affect the tiger population and its behaviour and this vital information would help the managers to prepare management plans for the long term conservation of the species.

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