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***Short Communication** (Open Access)*

A SHORT STUDY ON THE MARKING BEHAVIOURS OF FISHING CATS, *PRIONAILURUS VIVERRINUS* IN A SEMI-CAPTIVE CONDITION

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ABSTRACT
The study of semiochemicals has evolved a long way with the utilisation of constant observation and instrumental analysis. This study aimed at finding out behaviours related to odour and associated chemical signalling in two lesser-known Feline species. The zoo-behaviour is a prime way to find out their natural behaviours and how they interact with each other. In the observed behavioural study of the Fishing cats, we had seen the marking patterns and spatial organisation of male and female cats within a semi-captive arrangement. Conclusions including male presence in the vicinity of the water source and female presence along the periphery of the captive site are important to tally with their natural occupancies in the wild. The female was found to display scat, hypothesized as marking as our study unfolds. The females have also shown, most likely, to protect their territory from the cues of other animals of different species actively.

Keywords: *Semiochemicals, Fishing cats, Zoo Behaviour, Scat, marking patterns*

INTRODUCTION
Studying captive behaviour or more appropriately, zoo behaviour of animals is important and gaining space rapidly, as it is directly linked to welfare and psychology (Hediger and Sircom 1955; Hosey, 2005). Important observations correlating zoo behavioural patterns with brain functioning for primates, and faecal cortisol levels in predators in relation to visitors in zoos have been documented (Lewis, 2001; Pifarré *et al.,* 2011). All these observations are significant enough in ex-situ conservations and understanding general animal behaviours.
Animal behaviour is a commonly known and celebrated subject in the area of science. Numerous scientists have crossed far in deriving examples and planning tests that can accurately illuminate the normal cycles between the creatures. Natural chemistry is presently connected to conduct concentrates on account of untamed life. With the appearance of compound science, the identification of marking fluids and the way of behaving initiated by them is presently being advocated. They have been concentrated exhaustively on account of feline families with their related regenerative, territoriality, and diurnal movement designs.

Study Animal
Fishing cat, *Prionailurus viverrinus* (Bennett, 1833)- Fishing cats are closely related to leopard cats, and flat-headed cats owing to their morphological characteristics like conspicuous striped skin and spotty patches in the body including the head caught the attention of zoologists. The rapid fragmentation and destruction of habitats (Mukherjee et al, 2012) and the substantial rate of poaching have led to the quantification of fishing cats as 'Vulnerable' in 2016. Their number has been declining mainly in Southeast Asia.
Habitat and Distribution: The fishing cat is widely distributed in Indian wetlands including in Assam, and West Bengal, the fragmented population in Kerala, and some distributions have been noted also in Sri Lanka, Pakistan, Nepal and Bangladesh. (Sterndale 1884; Corbet *et al.,* 1992). They are widely distributed in islands, swamps and mangroves. They are excellent swimmers and predators. They have medium-sized bodies with weights averaging from 6kgs to 16kgs (Prater 2005). Human interference and conservation-

related aspects: Most of the habitats of a fishing cat often overlap with the fringe or urban settlements and are thus prone to frequent man-animal conflicts.

LOCATION OF STUDY

The present study has been performed preferentially in captive and semi-captive animal rescue and rehabilitation centres of West Bengal. The study site is a Mini Zoo, craftily established and working progressively in the conservation of fishing cats. Garchumuk Mini Zoo (GMZ) The observations made between the Fishing cats were done at the Garchumuk Mini Zoo, Uluberia - Shyampur Rd, Srirampur, West Bengal, India [GPS co-ordinates 22°20.886′ N, 88°04.379′ E].
The second study site is the Alipore Zoological Garden (AZG), Kolkata, West Bengal, India (22.5370° N, 88.3317° E).

METHODOLOGY

The study has been carried out for 10 days. 6 hours of observations are taken each day, under the supervision and inspection of GMZ and AZG authorities and zookeepers.

RESULTS AND DISCUSSION

Observations at GMZ

Like other felids, fishing cat marks their territory by urination, MF spraying, body rubbing, and scat deposition to leave scent marks (Mellen, 1993). General behavioural observation on the fishing cat during sample collection revealed four different physiological postures for semiochemical communication, just like other cats, like urination, MF spraying, scat deposition, and body rubbing. Males do scent marks more than females to display intra-sexual dominance over subordinates and maintain male superiority. The highest MF and urine marking incidents were observed in the case of males inside the feeding chambers. In contrast, scat markings were primarily observed around the periphery of the enclosure where they freely roam. In the observation, females were spotted mainly in the enclosure periphery, while males were seen throughout the enclosure mainly near the waterbody.
Female urination / MF markings were considerably low compared to males, and during our observation period, we encountered six incidents where the females marked (UR=5 times; MF=1 time). However, on three of the six occasions, they urinated in the water body inside the enclosure and twice inside the feeding chamber and once sprayed MF in a shrub inside the enclosure. However, the scat deposition rate in females was higher than in the other two marking forms.

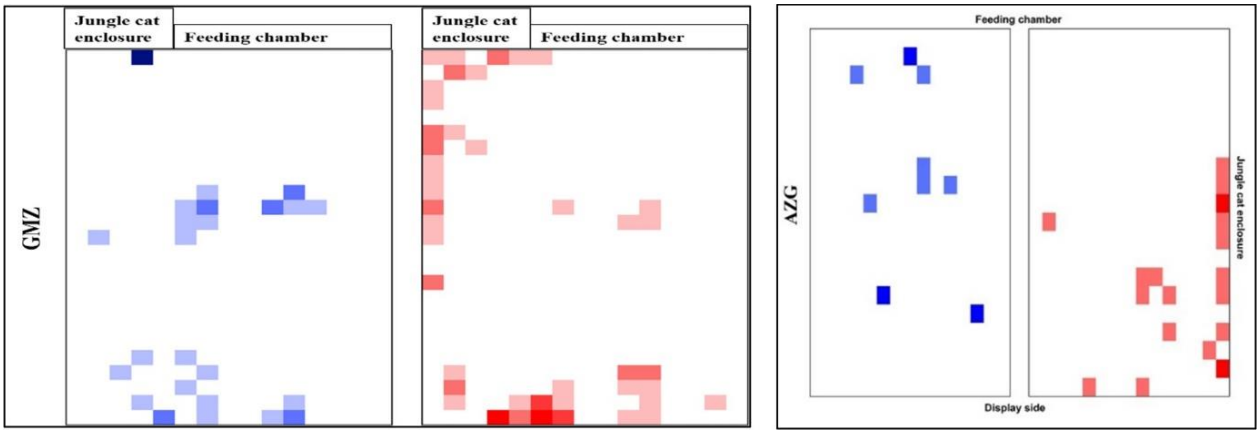

Figure 1: The positions of male and female fishing cats were noted at intervals for 5 minutes with a total of 300min during the daytime in GMZ and the spotted regions are represented in the heatmap. (Blue- male, Red- female)

Observations at AMZ

Observations were closely similar to the observations made at GMZ. The marking positions of the male and female cats were similar spatially. Observations were made of scat release by female fishing cat along the jungle cat enclosure. Here, observed numbers of marking are given in tabular form:

Field Station	**Hours of observation**	**Number of studied animals**	**Number of markings**	
AZG	60 hours (from March to August)	6 (2 ♂, 4 ♀)	Urine Release (UR) 2 ♂ 3♀	Marking Fluid (MF) 9 ♂ 1♀

DISCUSSION

The heatmap and observation clearly point out the male marking pattern, mostly in the water. It can be correlated to their natural habitat, where they are found to live and mark. In fact, the male resided much near the artificial water source in the enclosure. In the case of female fishing cats, activities and movements were observed in the vicinity of the jungle cat enclosure, but the males ignored the space. There is an observed clear temporal and spatial overlap in the movement and resting place of the male and female fishing cats. The female fishing cats were observed mostly to release scat along the periphery of the enclosure. The hypothesis developed includes the possibility of female fishing cats marking their territory with scat. This may help them in actively defending the periphery of their territories from foreign (jungle cats) interventions.

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