Understanding Reproductive Strategies: Courtship and Copulation Behaviours of the Asiatic Wild Dog (Cuon alpinus) in Captivity

Authors: Krunal Trivedi, Soham Mukherjee

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Affiliation: Sardar Patel Zoological Park, Gujarat, India; Life Science Education Trust, Bangalore, Karnataka, India

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Understanding Reproductive Strategies: Courtship and Copulation Behaviours of the Asiatic Wild Dog (*Cuon alpinus*) in Captivity

Krunal Trivedi[1], Soham Mukherjee*[1,2]
soham.naja@gmail.com
[1]Sardar Patel Zoological Park, Gujarat, India; [2]Life Science Education Trust, Bangalore, Karnataka, India

Abstract

This study offers an in-depth observation of the courtship and copulatory behaviors of the Asiatic wild dog (*Cuon alpinus*), also known as the dhole, within a captive environment at the Sardar Patel Zoological Park, Ekta Nagar, Gujarat. Characterized by unique vocalizations, distinct body postures, and specific initiation cues, the reproductive strategy of the dhole exhibits both complex communication and consensual mating processes. Our observations revealed notable behaviours such as mutual grooming, nuzzling, olfactory exploration, and specific tail positioning, which signify readiness and consent for mating. The study meticulously documents the mounting attempts, copulation frequency, duration, and post-copulatory affiliative behaviours, contributing valuable insights into the dhole's reproductive behaviours. Through detailed analysis of these behaviours, this research aims to enhance our understanding of dhole reproduction, offering critical data to inform conservation strategies and captive breeding programs designed to support the survival of this endangered species. The birth of a litter of three male pups marks the successful culmination of the observed reproductive cycle, underscoring the potential of captive studies in aiding the conservation efforts for the Asiatic wild dog.

Keywords: Asiatic wild dog, *Cuon alpinus,* Reproductive biology, Captive breeding.

Introduction

The Asiatic wild dog (*Cuon alpinus*) or the dhole, distinguishes itself as one of the ten widely distributed canid species documented in Asia (Din et al., 2013). Currently, it holds a global classification as "Endangered" by the International Union for Conservation of Nature (IUCN), with an estimated population ranging between 4,500 and 10,500 individuals. In India, significant populations are concentrated notably to the south of the Ganges River, primarily in the Western Ghats and central forested regions (Kamler et al. 2015).

Despite its precarious "Endangered" status, the Asiatic wild dog has received relatively less attention in terms of conservation efforts compared to other charismatic carnivores (Widodo et al. 2020). This underlines the importance of dedicating resources to ensure the survival and well-being of this distinctive canid species, given its critical role in maintaining the ecological balance in the regions it inhabits.

Due to their exceptionally secretive behaviour in their natural habitat, there is a scarcity of information regarding the reproductive biology of Asiatic wild dogs (Nowak and Paradiso 1983). As outlined by Davidar (1972) and Johnsingh (1982), the species is known to exhibit an annual breeding season. Although a few valuable observations are documented in reports by Gewalt (1978), Cohen (1985), and Sosnovskii (1987), it is critical to improve our understanding of dhole reproduction and behaviour for the sake of future conservation.

Captive studies play a pivotal role in bridging this knowledge gap. In captivity, Asiatic wild dogs can be studied with less interference from external factors, allowing for detailed examinations of enclosure preferences, reproductive biology, courting, and mating behaviours, as well as the intricacies of pup growth and early development.

In this study, we documented and analysed specific courtship and copulation behaviours of Asiatic wild dog pair in captivity. We conducted the research at the Sardar Patel Zoological Park in Ekta Nagar, Gujarat, which provided a controlled environment for observing Asiatic wild dog reproductive behaviours. The pair was housed in a 900 square metre. enclosure with viewing glass for visitors.

Methodology

The breeding habits of the Asiatic wild dog pair were meticulously documented in our study, which lasted 34 days, from October 13, 2022, to November 15, 2022. We wanted to understand more about their courtship, mating practices, mating frequency, and preferred mating locations within their enclosure.

To ensure comprehensive coverage and minimal disturbance to the natural behaviours of the subjects, we utilized a Bushnell Trophy CAM HD Trail Camera, equipped with an IR flash. This technology allowed us to continuously monitor and record the activities and behaviours of the Asiatic wild dog pair, both during the day and under low light conditions. The camera was strategically positioned to maximize visibility of the dholes' preferred areas within their enclosure.

In addition to the automated camera surveillance, our research team conducted direct observations to complement and verify the video data. These manual observations were carried out daily from 08:00 to 18:00 hours. During these sessions, the team recorded various behaviours and interactions between the pair, paying close attention to the nuances of their courtship and mating rituals. Notably, we observed that mating frequency was highest at the onset of the breeding season, gradually decreasing to once per day towards the season's conclusion.

This dual approach, combining technology-assisted monitoring with hands-on observational studies, provided a robust dataset for analysing the reproductive behaviours of the Asiatic wild dog in captivity. Such detailed observations are crucial for understanding the species' mating patterns, preferences, and social dynamics, which are essential for developing informed conservation strategies and management practices for this endangered species.

This methodology aligns with contemporary practices in wildlife research, emphasizing the importance of non-intrusive monitoring techniques to study the natural behaviours of species in both wild and captive settings (Berger-Tal & Saltz 2014; Caro 2007). By employing both automated and manual observation methods, we aimed to minimize observer effects while maximizing the accuracy and breadth of behavioural data collected.

Results and discussion

During the breeding season, the observed pair of Asiatic wild dogs (*Cuon alpinus*) demonstrated a range of unique vocalizations and body postures indicative of their

complex courtship rituals. High-pitched whines and soft growls were prominently noted, displaying distinct variations correlating with different stages of courtship, suggesting a sophisticated communication system (Johnsingh 1982). Observational data revealed that courtship behaviour included a mix of submissive gestures and playful interactions, with the pairs showing clear initiation cues prior to copulation, such as mutual grooming, nuzzling, sniffing, specific tail positioning, and a sequence of low-intensity vocalizations, which are indicative of a consensual mating process (Fox 1978).

Mounting behaviours were a significant aspect of the courtship, with the male attempting to mount the female multiple times. However, actual copulation occurred 2-4 times daily, often initiated by the female demonstrating readiness, highlighting her active role in the mating process. Olfactory exploration, particularly the male sniffing the female's genital area, was frequently observed and seemed critical for assessing reproductive readiness, a behaviour consistent with findings in other canid species (Lopez 1978).

A notable behaviour signalling consent and readiness for copulation was the female lifting her tail to the side, facilitating vaginal penetration. During copulation, the male firmly grasped the female, securing her in a position that facilitated a series of deliberate, rhythmic thrusts, eventually leading to the formation of the characteristic canid "tie," a phenomenon well-documented among canids as crucial for successful insemination (Asa & Valdespino 1998).

The duration of copulation events varied, averaging between 8 to 15 minutes (n=42). Following copulation, the pair exhibited affiliative behaviours such as mutual resting and grooming, indicative of a strong social bond that may play a role in the success of reproduction (Kleiman 1977). The culmination of these breeding efforts was the birth of a litter of three male pups on December 25, 2022.

This observation of courtship and copulation behaviours in captive Asiatic wild dog pairs contributes to our understanding of this endangered species' reproductive strategies. Insights into the initiation, duration, and post-copulation behaviours are essential to advancing conservation strategies and captive breeding programmes.

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Figures

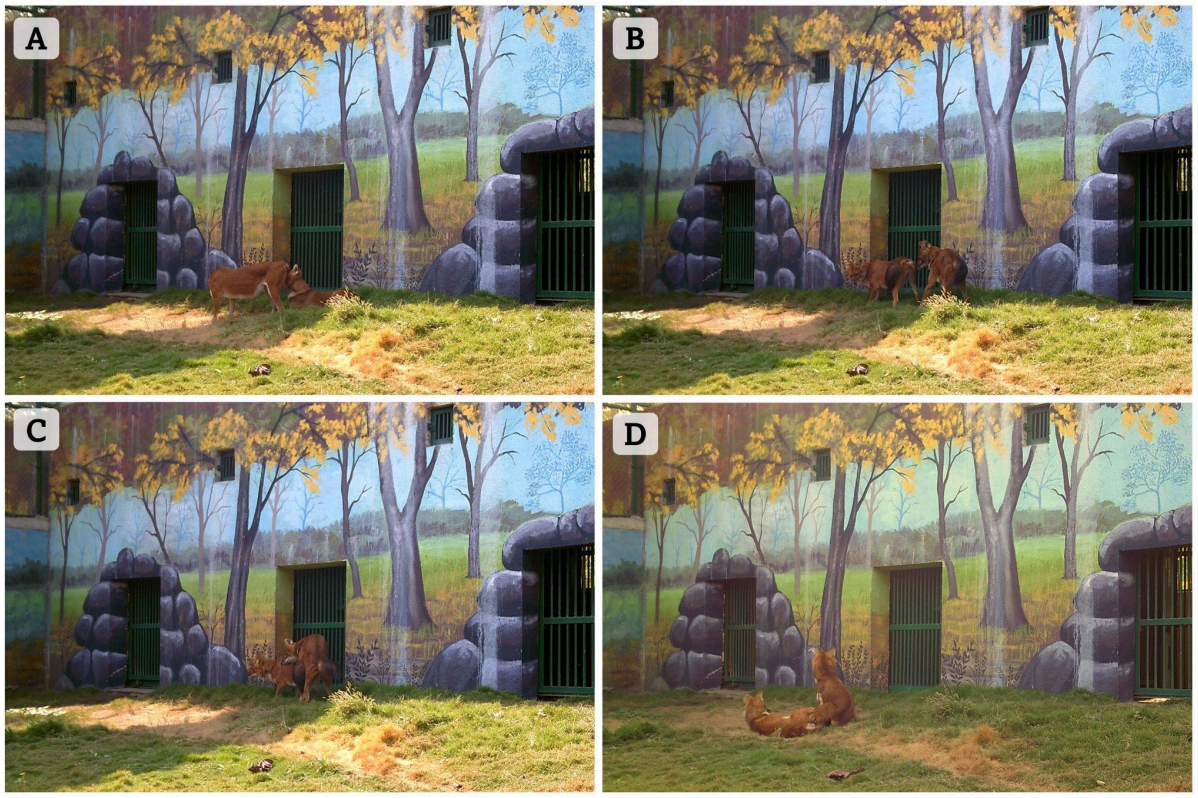

Figure 1: (A) Male dhole sniffing genital of female. (B) Female lifting the tail on side to give consent to male for copulation. (C) Male copulating with the female. (D) Male and female in the copulatory tie. (Pic Credit: Krunal Trivedi)

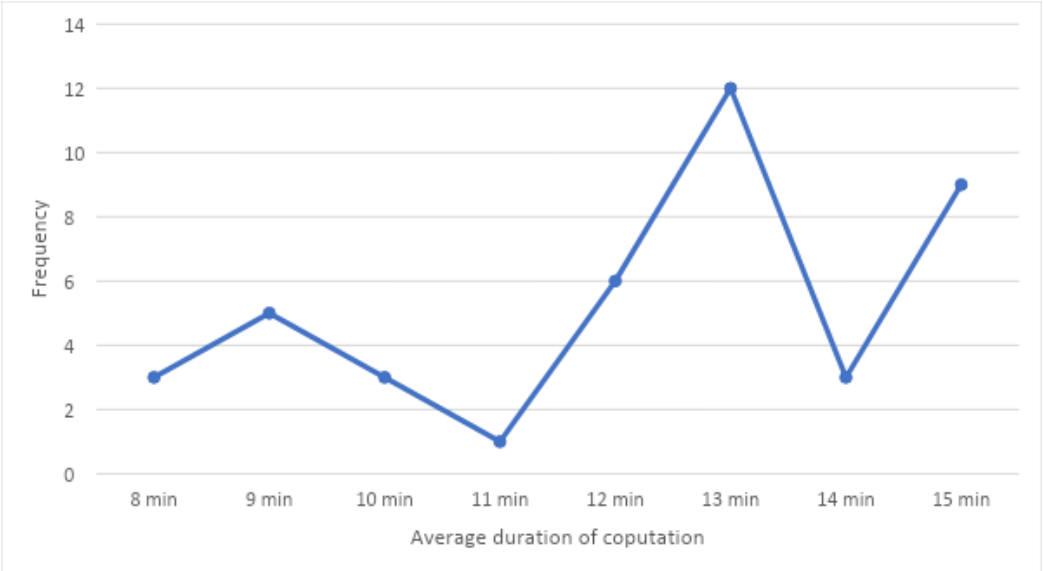

Figure 2: A line graph highlighting the average duration of copulation including the copulatory tie in Asiatic wild dog.

About the Author

Krunal Trivedi, a wildlife biologist from Gujarat, India, started rescuing wildlife when he was 14 years old. He studied snakes in Thailand and specialises in human-wildlife interactions, particularly in human-dominated environments. As a member of the IUCN Otter Specialist Group and the IUCN Species Survival Commission, he addresses human-leopard and human-otter conflicts. With extensive experience in wildlife rescue and research, he currently works as a zoo biologist at Sardar Patel Zoological Park in Gujarat, where he contributes to animal welfare and conservation efforts.

Soham Mukherjee is a herpetologist and wildlife biologist who specialises in crocodiles and venomous snakes. He has worked as a full-time wildlife rehabilitator with a wide range of taxa, including reptiles, mammals, birds, and arachnids. He has worked on endangered species conservation management projects both in-situ and ex-situ. He is particularly interested in conservation breeding, behaviour and cognition, enrichment in captivity, and human-wildlife interactions. He has extensive experience in snakebite and human-crocodile conflict mitigation, and is a member of the IUCN-SSC Crocodile Specialist Group, Viper Specialist Group, and Snake Specialist Group. He currently works as a specialist consultant for zoos and conservation centres.