

## Field report

### Going for the kill: observation of a wolf-hyaena interaction in Kailadevi Wildlife Sanctuary, Rajasthan, India

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## Abstract

Interactions among large carnivores are unusual but provide valuable information on species behaviour and insights into competition. Although many studies have documented interactions between different carnivore species, direct observations of wolf and hyaena interactions have rarely been recorded. We present such an observation from Kailadevi Wildlife Sanctuary in Rajasthan, India, and recommend further studies to better understand the dynamics of wolf-hyaena interactions.

## Introduction

Inter-specific competition among carnivores has important implications for the structure and function of carnivore communities (Caro and Stoner 2003). The mechanisms of carnivore interactions are however, far from understood, yet key to enabling or hindering their coexistence, and hence are highly relevant for conservation. Indian wolves *Canis lupus pallipes* and striped hyaena *Hyaena hyaena* are top carnivores in Indian open plains (semi-arid grasslands, scrublands, grazing lands, and agro-pastoral lands). Wolves primarily feed on ungulate species including livestock (Jhala 2003), while hyaenas are opportunistic and generalist feeders that predominantly scavenge domestic and wild ungulate carcasses, including other carnivore kills. Since wolves are wide ranging (Jhala 2003) and many carnivores are secretive in nature, information on interactions of wolves and other carnivores is very rare. Studies of carnivore interactions include those documenting interference competition between species such as wolves and coyotes *Canis latrans* (Berger and Gese 2007) and between wolves and smaller species such as Indian fox *Vulpes bengalensis* (Jhala 1991). Studies have also documented stealing of prey. For example African wild dogs *Lycaon pictus* (Cooper 1991; Carbone et al. 1997) and cheetah *Acinonyx jubatus* often lose their prey to lions *Panthera leo* and spotted hyaenas *Crocuta crocuta* (Creel and Creel 1996). However, interactions between two competing species may take various forms, ranging from tolerance to predation, as seen in coyotes and red foxes *Vulpes vulpes* (Gese et al. 1996), and in wolves and coyotes (Thurber et al. 1992; Peterson 1995). We present a rare event of an interaction between wolves and

hyaenas from Kailadevi Wildlife Sanctuary in the state of Rajasthan, India. We are unaware of other observations of the direct interaction between these two species.

Kailadevi Wildlife Sanctuary (KWLS) and Ranthambhore National Park (RNP), connected to each other via the Banas river habitat block, presently forms the Ranthambore Tiger Reserve (Figure 1). The connecting block supports and facilitates dispersing tigers *Panthera tigris* from RNP. Different geographical features like ravines, streams and gorges are unique to this part of the semi-arid landscape and provide cover to dispersing animals. The landscape is dominated by gorges with forests of *Anogeissus pendula* and scrub forests of *Zizyphus*. Besides the occasional presence of tigers, KWLS is home to leopards *Panthera pardus*, sloth bears *Melursus ursinus*, palm civets *Paradoxurus hermaphroditus*, golden jackals *Canis aureus*, Indian foxes, striped hyaenas and wolves.

Wolves face many threats to their survival in this landscape. Most threats relate to livestock, and wolves are often killed by livestock herders, who also destroy their dens and rendezvous sites. Hyaenas mostly come into conflict with humans due to their preying and scavenging on livestock or raiding farms in human dominated landscapes. They are often poisoned or trapped. During a habitat assessment survey on 22 December 2014, a day-old carcass of a cow (kill believed to be made by a pack of wolves) was found within the sanctuary (N 26° 12' 35.0" and E 76° 57' 26").

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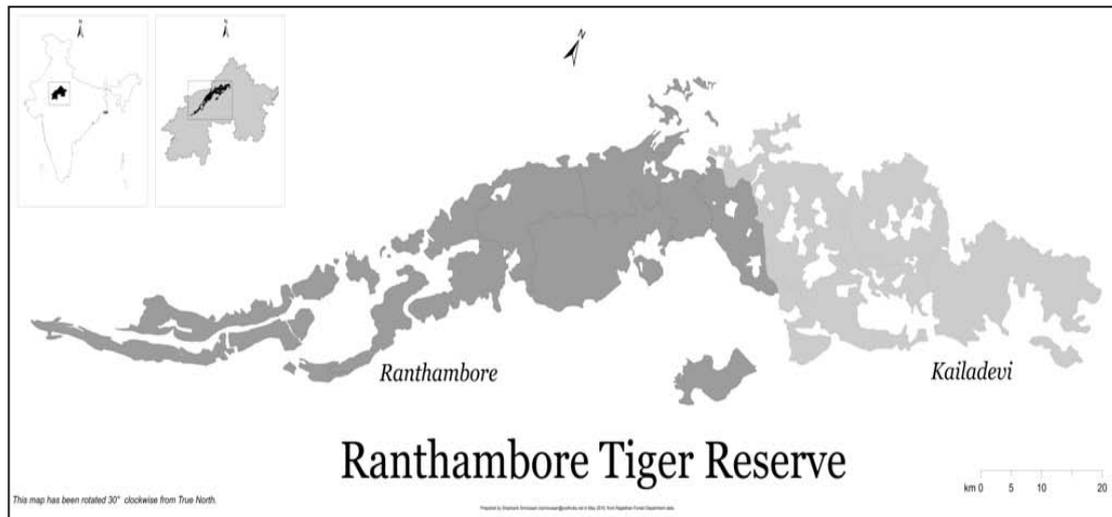


Figure 1. Map of Ranthambore Tiger Reserve showing Kailadevi Wildlife Sanctuary in Rajasthan, India.

Due to high anthropogenic activity in the area, camera traps (Cuddeback, Green Bay, Wisconsin, USA) were deployed at the kill site immediately to determine the species involved in the depredation. At approximately 1830hrs, the team initially saw an Indian fox near the kill, which quickly disappeared as soon as a pack of three to four wolves arrived. Within five to six minutes there was a flash from a camera trap, followed by some barking-like sounds indicating hyaena presence. The wolves moved away initially, but came back again within minutes and quarrelled over the carcass with hyaenas numbering around two to three for around five to ten minutes. There were clear chomping sounds of bone probably made by the hyaenas, who also dragged the carcass a few metres away from the camera traps. The wolves took over the carcass and chased away the hyaenas (Figure 2). There was clear interaction between the wolves and the hyaenas, although no injuries on either species were recorded. The carcass was completely consumed.



Figure 2. Wolves and hyaenas at the kill site in Kailadevi Wildlife Sanctuary, Rajasthan, India.

The coexistence of wolves and hyaenas is a complex balance between competition and prey availability, which to some extent within the ecosystem determines which predator is more dominant. Among carnivores, interference competition may be symmetrical (both species interfere or kill each other) or asymmetrical (one species is clearly dominant over the other), but dominance is typically based on size (Peterson 1995; Palomares and Caro 1999). Wolves being larger in size and living in packs could therefore have advantage over hyae-

nas, as was also observed in this scenario. Such interactions have generated interest in determining how large carnivores shape and drive community structure (Terborgh and Estes 2010; Estes et al. 2011; Ritchie et al. 2012; Ripple et al. 2014). Mammalian carnivore species therefore often co-occur, potentially creating complex inter-specific interactions and trophic dynamics (Davis et al. 2015). If sympatric carnivores use the same food resources, interactions can range from commensalism to mutualism to competition and predation (Paquet 1992; Fedriani et al. 2000; Creel 2001; Caro and Stoner 2003). Carrion forms an important part of the diet of carnivores, which may scavenge on the carcasses of animals much larger than themselves (Selva et al. 2005). In North America, interference competition between grey wolves, coyotes and foxes has been well studied at a local landscape level (Merkle, Stahler and Smith 2009; Gosselink et al. 2007). At a broader regional scale, inverse relationships between the densities of both wolves and coyotes (Berger and Gese 2007), and coyotes and foxes (Fedriani et al. 2000; Levi and Wilmers 2012) are supported by numerous accounts of spatial and temporal separation.

However, there are still many gaps in our knowledge related to the dynamics of wolf-hyaena interactions and the extent of competition that may occur. We recommend further studies that examine spatial and temporal resource partitioning between species and the direct and indirect effects of each species on the Ranthambore ecosystem. As the survival of many species in India become increasingly dependent on management, it is critical to understand such interactions and thereafter provide better information for protected and non-protected area managers.

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## Biographical sketches

**Sailaja Nayak's** interest lies in studying the dispersal patterns of tigers, understanding behavioural ecology and population trends of co-predators in the Western India Tiger Landscape of WWF-India.

**Sunny Shah** leads the team in WWF-India's Western India Tiger Landscape. He is interested in landscape level factors affecting tiger and other wildlife's movement. He also is interested in conflict management and enforcement related issues in the area.

**Jimmy Borah** is interested in understanding the population dynamics of tigers and other large carnivores, and in studying human-carnivore conflicts at the landscape level. He currently leads WWF-India's Tiger Conservation Programme in priority landscapes within India, and wants to use science and research to influence policy level decisions for tiger conservation.