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Distribution update

First camera trap record of pack hunting dholes in Chitwan National Park, Nepal

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Abstract

Intensive camera trapping recorded the presence of dhole *Cuon alpinus* across the churia habitat in Chitwan National Park, Nepal. We amassed 2,145 camera trap nights of effort in a single dry winter season in 2011 that resulted in 22 independent photos containing the dhole, including eight photos containing the species in packs. This is the first camera trap record of the dhole pack hunting ever recorded from Chitwan National Park in Nepal. Dholes were found to be sympatric with tigers *Panthera tigris*, leopards *P. pardus* and golden jackals *Canis aureus*.

Introduction

The Asian wild dog or dhole *Cuon alpinus* (Pallas, 1811) has been listed as Endangered by IUCN (Durbin et al. 2008), with fewer than 2,500 individuals remaining in the wild. In South Asia, they range across the foothills of the Himalayas in India, Bhutan, Bangladesh, and Nepal. In Nepal, there were several unconfirmed reports of their occurrence. With the advancement in the non-invasive techniques such as camera trapping (Karanth et al. 2008, Karanth et al. 2010), it has been possible to confirm the presence of elusive carnivores including the dhole through photographic evidence. Dholes have been widely studied in India and Bhutan (Karanth and Sunquist 1995, Karanth and Sunquist 2000, Wang and Macdonald 2009), but this current study is the first of its kind conducted in the lowland areas of Nepal.

Methods

We deployed camera traps (Karanth and Nichols 2002) across 700km^2 of foothill habitat known as the churia habitat in Chitwan National Park from January to March 2011. Cameras were deployed across strategic locations (such as riverbanks, firelines, game trails, etc.) that are likely to be traversed by predators. Strategic locations were chosen after the initial reconnaissance survey. We divided the study area into four blocks of 175km^2 each and within each block used an average of 40 camera trap stations, which were active for 15 days each. We used a combination of Moultrie D50 (25 sets) and Moultrie D55 (15 sets) passive camera traps. No bait was used during the survey. We conducted the survey in the dry winter season (January-February) in 2011. We completed the survey in a total of 60 days resulting in a sampling effort of 2,145 trap nights from all four blocks combined. We sorted all the camera trap pictures and considered photos as independent events if they were 30 minutes or more apart, as is commonly done in camera trap studies (Silver et al. 2004, Di Bitetti et al. 2006). As it was difficult to individually identify dholes, we used capture events (number of independent photos) per unit effort (per 100 trap nights) to measure the trapping rate or relative activity of the dhole (Karanth and Nichols 2002, Kelly 2008).

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Results

From a total of 35,646 camera trap pictures from 161 camera trap locations we obtained a total of 22 independent pictures of dholes from the churia habitat in Chitwan National Park. We obtained the first picture of dholes in a pack of the five individuals preying upon southern red muntjac or barking deer *Muntiacus muntjak* on 25 January 2011 at 09:15h on the riverbank of Kana Mana Valley, located in the south western most part of Chitwan National Park (Figure 1). This picture confirms the occurrence of dhole in this area (this study, Karki 2011) as well as pack hunting (Johnsingh, 1983). Fresh blood seen flowing down the river in the series of photographs of the incident seem to indicate this was a fresh kill rather than scavenging. The positive identification was further confirmed through comparisons with the photo digital archive of the Smithsonian Institution and expert opinion (A. Johnsingh, pers. comm.). We identified dholes in nine different locations in Chitwan National Park (Figure 2). The majority of observations were recorded in the churia habitat, except in one instance where a dhole was captured in a lowland area in the *Shorea robusta* (sal) forest. Spatially, we identified five potential packs of dholes in the churia habitat of Chitwan National Park. Average pack size ranged from two to seven individuals. Dholes were found to be active during day time (77% of photos). The trapping rate of dholes was 1.02 dhole pictures per 100 trap nights.

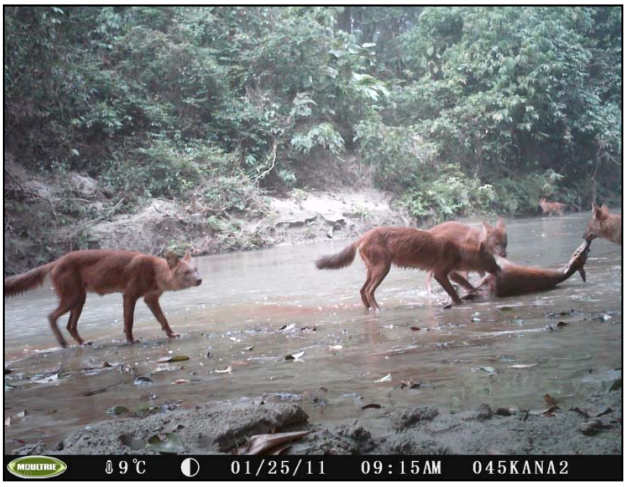
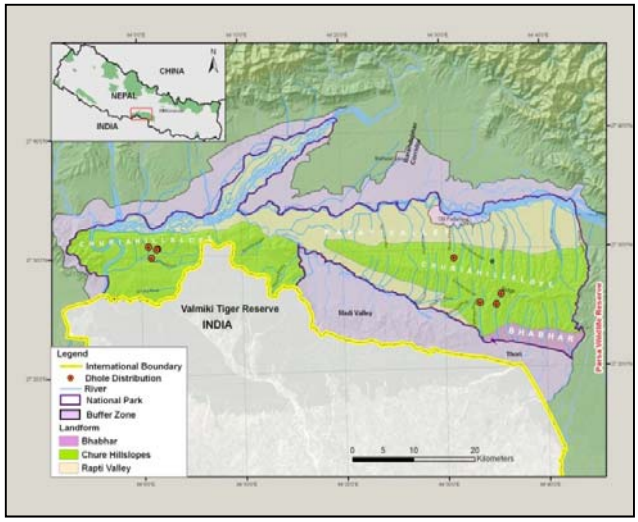


Figure 1. Pack hunting dhole preying upon barking deer in Kana Mana Valley, Chitwan National Park.

Discussion

Dholes are sympatric with other predators like tigers *Panthera tigris*, leopards *P. pardus* and golden jackals *Canis aureus*, potentially playing a major role in shaping prey community dynamics (Karanth et al. 2004). Unlike tigers and leopards, dholes are social hunters, capable of feeding on small to very large prey species (Johnsingh 1983). In our study, dholes were found to prey upon medium-sized ungulates like barking deer based on camera trap photos (Figure 1) and can also potentially scavenge on the remains of the prey of other large predators. Sambar *Rusa unicolor*, chital *Axis axis*, muntjac and wild boar *Sus scrofa* (in no particular order) were the main prey species recorded in the study area. We also observed a few records of four horned antelope *Tetracerus quadricornis* (pellet signs) in the western part, and Himalayan serow *Capricornis thar* (direct observations and camera trap photos) in the eastern part of the study area, although they were not only confined to these areas. In addition, we recorded camera trap photo evidence of nine small carnivore species: jungle cat *Felis chaus*, fishing cat *Prionailurus viverrinus*, leopard cat *P. bengalensis*, large Indian civet *Viverra zibetha*, small Indian civet *Viverricula indica*, common palm civet *Paradoxurus hermaphroditus*, crab eating mongoose *Herpestes urva*, golden jackal and yellow-throated marten *Martes flavigula*.

Figure 2. Camera trap evidence of dhole presence in Chitwan National Park.



The range of dholes extends across the lowland areas of Nepal; however, due to the lack of photographic evidence their presence could not be confirmed except in Chitwan National Park. In Parsa Wildlife Reserve, which is contiguous to Chitwan to the East, direct sighting of dholes took place but they were not captured during a 2009 camera trap survey. Similarly, direct sighting of seven individuals was reported in the Babai Valley of Bardia National Park in 2008, but no dholes were recorded during a 2009 camera trap survey (N. Subedi, pers. comm.). Dholes have been reported by local communities in Banke National Park in the western lowland area of Nepal (Thapa 2011), but were not confirmed during this study. Dholes have also been reported in Kanchenjunga Conservation Area in the eastern highlands of Nepal (Table 1) (Khatiwada et al. 2011).

A decline in the prey base is the major threat to carnivore species including the dhole (Karanth et al. 2004, Andheria et al. 2007). Poaching of prey species was found to be high in the western section of Chitwan National Park which borders the Valmiki Tiger Reserve in India. During the survey, we heard gun shots that we assumed were from hunters. This highlights the major threat to the survival of large carnivores through the decline in their prey base. Interestingly, there have been no reported cases of human-wildlife conflict with dholes (e.g. livestock depredation), perhaps implying an intact population in protected wild areas and sufficient prey for this predator. So far there have been no cases of disease prevalence reported from domestic dogs to dholes and jackals. Narayani River in the western part of National Park may act as a buffer to domestic-wildlife species interactions. Even though the dhole is listed as Endangered, there is less information available on its ecology and distribution compared to other sympatric carnivore species across the lowlands of Nepal. Interspecific competition among tigers, leopards and dholes most likely occurs, but there is little information about spatial, temporal, or dietary partitioning among these top predators to explain coexistence in the study area. More research is needed on dhole ecology to determine the role this understudied species has on the predator and prey community of lowland Nepal.

Protected Area	Dhole Presence	Type of Record	Habitat Type	Source
Chitwan National Park	Confirmed	Camera traps	Churia sal forest	This study
Parsa Wildlife Reserve	Confirmed	Direct sighting	Churia sal forest	First author
Bardia National Park	Reported but not confirmed	Direct sighting	Lowland forest	(Odden and Wegge 2009); N. Subedi (pers. obs.)
Banke National Park	Reported but not confirmed	Local people	Lowland forest	(Thapa 2011)
Suklaphanta Wildlife Reserve	Not reported			
Koshi Tappu Wildlife Reserve	Not reported			
Makalu Barun National Park	Confirmed	Park record	Temperate forest	(Jha 2003)
Dorpatan Hunting Reserve	Confirmed	Park record	Temperate forest	DNPWC
Rara National Park	Reported	Park record	Temperate forest	(DNPWC 2010)
Sagarmatha National Park	Not reported			
Kanchenjunga Conservation Area	Confirmed	Camera traps	Temperate forest	(Khatiwada et al. 2011)
Annapurna Conservation Area	Not reported			
Gaurishankar Conservation Area	Reported but not confirmed		Temperate and Sub Alpine forest	
Manaslu Conservation Area	Not reported			
Sheypoksundo National Park	Not reported			
Shivapuri National Park	Not reported			
Langtang National Park	Reported	N/A	Temperate forest	(FRA 2000)
Khaptad National Park	Reported	N/A	Temperate forest	(DNPWC 2012)

Table 1. Occurrence of the dhole across Protected Areas of Nepal.

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Biographical sketches

Kanchan Thapa is a doctoral student at Virginia Tech studying tigers in Nepal.

Marcella J. Kelly is an associate professor at Virginia Tech specializing in carnivore population dynamics, and has studied large carnivores including Bengal and Sumatran tigers, cheetahs and jaguars.

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Naresh Subedi is a doctoral student at Wildlife Institute of India and is currently pursuing his studies on the greater one horned rhinoceros.