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Editor-in-Chief
A - 47, Rameswarpatna, Maushima Square
Bhubaneswar - 751 002, Odisha
e-mail - eplanetjournal@gmail.com
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Photographic evidences of Indian grey wolf (*Canis lupus pallipes*) in Sundargarh forest division, Odisha, India

N.C. PALEI[1*], B.P. RATH[1], H.S. PALEI[2] AND A.K. MISHRA[3]

[1]*O/o Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden, Odisha, India*

[2]*Aranya Foundation, Bhubaneswar, Odisha, India*

[3]*Sundargarh Forest Division, Odisha, India*

**wildpalei@gmail.com*

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ABSTRACT

The Indian grey wolf (*Canis lupus pallipes*) is a rare and lesser-known top predator in India. A rapid camera trapping survey was conducted to assess the large carnivores and their preys in the Sundargarh forest division, Odisha, India. Two individuals of Indian grey wolf were recorded during the survey offering the first photographic evidence of the Indian grey wolf outside protected areas of Odisha. This record increases knowledge on the distribution of the species. More extensive surveys are needed to understand the distribution and population dynamics of Indian grey wolf in the area. We provide photographic evidence of Indian grey wolves and highlight the importance of Odisha forest for species conservation.

Key words: Camera trapping, *Canis lupus*, Indian grey wolf, Odisha, photographic evidence

INTRODUCTION

Wolves are placed in the family Canidae and the genera *Canis* includes species of wolves, jackals, and the domestic dog. The taxonomy and phylogeny of the wolves has been variously explained as including a single species *C. lupus* (Nowak, 2009) or at most as two species with the second being *C. rufus* as suggested by Goldman (1937). Two of these subspecies, the Tibetan wolf (*Canis lupus chanco*) whose range extends from the trans-Himalaya into Tibet and China, and the Indian wolf (*Canis lupus pallipes*) ranging over much of Peninsular India inhabit the Indian subcontinent. Traditional taxonomy considers them as distinct relatives of other Gray wolves; however, recent molecular genetics studies contest this and suggest that (WII, 2017) the wolves from the Himalayas (Tibetan wolf, *Canis lupus chanco*) are the basal form that gave rise to the Indian wolf (*Canis lupus pallipes*).

Further, the two are distinct enough to be treated as full species (Aggarwal et al., 2003). Sharma et al. (2004) suggested that wolf populations of Indian subcontinent have three divergent, ancient and parapatric mtDNA lineages; namely the *Canis lupus pallipes* clade (peninsular India, Iran, Iraq and parts of Arabia), Himalayan clade of *Canis lupus chanco* (Ladakh, Spiti, Tibet and Nepal) and the wolf-dog clade of *Canis lupus chanco* (northwest Jammu and Kashmir, i.e. Gilgit and Baltistan). Based on a combined analysis of nuclear and mitochondrial DNA, Bardeleben et al. (2005) suggested that the relationships among the wolf-like canids remains poorly understood due to their recent divergence. Aggarwal et al. (2007) proposed the revision of the taxonomy of the wolves in India and proposed a new species *Canis indica*. Conclusive evidence that fully elucidates the taxonomy and phylogeny of the wolves remains to be fully explained and the studbook uses the

taxonomy suggested by Nowak (2009).

The Indian grey wolf *Canis lupus pallipes* is considered as the top carnivore species of the Indian open plains, semi-arid grasslands, scrublands and grazing lands (Singh and Kumara, 2006). It is considered as endangered species in India, features on Schedule-I of the Indian Wildlife (Protection) Act, 1972 and listed as Appendix-I under the Convention on International Trade in Endangered Species (CITES). The species can grow up to a height of 65 to 75 cm with a body length of 90 to 105 cm excluding 35-40 cm tail. They attain a body weight upto 40 to 60 kg. The dentition and large skull distinguish the wolves from rest of the family. The skin colour of the species varies from grey and blacking coat (Prater, 2005). Jhala (2000) estimated that the wolf population was between 2000-3000 in entire Indian peninsula. The Indian grey wolf had once one of the largest natural range of any land mammal (Sheldon, 1992). The Indian grey wolf is widely occurring, but at low density throughout its range in the Indian sub-continent. The core habitat of this species is the western, central and peninsular India in open grassland, scrubland and rocky hills (Sahi, 1982). The eastern population of Indian grey wolf found in Odisha, Jharkhand, Bihar and parts of West Bengal, is an exception and occurs in moist forested habitats (Sahi, 1982). They prefer open forest on the periphery of protected forest areas where forest reduced to scrub forest due to heavy biotic pressure (Jhala, 2003). Only a few reports on the occurrence of wolf are available from Odisha (Palei et al., 2013; Nair and Panda, 2013). Camera traps is increasingly used as survey tool to study wildlife (Das et al., 2019). Here we report the photographic evidence of Indian grey wolf from Sundargarh Forest division, Odisha, India.

MATERIALS AND METHODS

The Indian grey wolf was recorded during the survey of carnivores and their prey species in Sundargarh Forest division, western Odisha. The study area lies between 21º 47' 7" N to 22º 32' 2" N and 83º 32' 19" E to 84º 34' 18" E (Fig. 1). The forest division shares its boundaries with Chhattisgarh and Jharkhand. It covers 3576.39 km^2 and is dominated by tropical dry-deciduous, northern tropical dry-deciduous and northern dry-mixed deciduous forest (Champion and Seth, 1968). The major species, viz. *Anogeissus latifolia, Terminalia tomentosa* and *Ougeinia dalbergioides* etc., which are more akin to the dry deciduous forest, whereas the low level Sal forest are characterized by dense undergrowth because of its comparatively cooler climate and species like *Syzygium cumini, Albizzia* species, *Emblica officinalis* etc. are the common associates. The main species present in the top storey are *Shorea robusta, Terminalia tomentosa, Anogeissus latifolia, Pterocarpus marsupium, Adina cordifolia, Syzygium cumini, Mytragyna parvifolia and Albizzia procera*. The middle storey contains *Dalbergia latifolia, Ougeinia oojinensis, Gmelina arboria, Bridelia retusa and Cleistanthus collinus*. The ground flora comprises *Holarrhena antidysentrica, Nyctanthes arbortristis*etc and the important climbers are *Bauhinia vahlii, Combretum decandrum* etc.

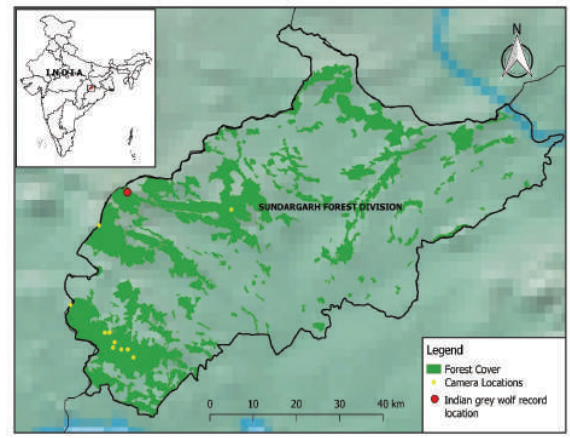

Fig. 1. Indian grey wolf captured location in Sundargarh Forest Division, Odisha, India

The mean minimum and maximum temperature varied from 6-20 °C in January and 35-45 °C in May. The mean annual rainfall is 1,100-1,500 mm during the monsoon between June and September. We used 45 motion sensor camera traps (Cuddeback Model C1) to carry out a mammal survey from 25th October to 20th November 2018. We set up 30 camera trap stations in Dangakhol,

Garjanpahad Reserve Forest of Hemgiri forest range, 15 in Jamkani Reserve Forest of Lepripara forest range and one in Dhanubauns Reserve Forest of Gopalpur forest range (Fig. 1). We selected most suitable sites likely to trap all species based on preliminary sign surveys of their tracks and scats. Moreover, we interviewed local forest staff. Camera traps were predominantly set along forest roads, game trails and footpaths. At each location one camera trap was installed for 25 days, yielding a total of 1125 trap nights.

RESULTS AND DISCUSSION

During the survey we recorded a total of five localities in 12 photograph captured Indian grey wolf in Sundargarh Forest Division. A total 45 camera trap stations with a total sampling effort of 1125 trap days from 25th October to 20th November 2018. Out of 45 locations five locations were recorded in Indian grey wolf. The first photograph of a male Indian grey wolf was obtained once on 12th May 2018 at 07:12 (Fig. 2). After that, a female Indian grey wolf was photographed on 19th May 2018 at 09:04 (Fig. 3). The Indian grey wolf photos and different camera trap stations (Fig. 2 and 6; Table 1).

Fig. 2. Camera trap photo of a male Indian grey wolf was captured on 12th May 2018 in Ushakothi, Lepripara Range, Sundargarh Forest Division, Odisha, India.

The population of Indian grey wolves were sporadic and rare in Odisha. Several camera trap studies in different parts of Odisha did not reveal their presence (Palei et al., 2016; Debata and Swain, 2018). But it may be possible that due to its elusive behaviour, naturally low population density (Jhala, 2003). However, Palei et al. (2013) reported the livestock depredation by Indian grey wolf in Hadagarh Wildlife Sanctuary, Odisha. Therefore, survey of population trend, ecology and threats of Indian grey wolf in Odisha is needed to understand its status.

Fig. 3. Camera trap photo of a female Indian grey wolf was captured on 17th May 2018 in Jamkani, Sundargarh Forest Division, Odisha, India.

Fig. 4. Camera trap photo of a male Indian grey wolf was captured on 11th April 2018 in Singharibahal, Hemgiri, Sundargarh Forest Division, Odisha, India

In addition to the Indian grey wolf, threatened species such as tiger (*Panthera tigris)*, leopard (*Panthera pardus)*, elephant (*Elephas maximus)*,

Fig. 5. Camera trap photo of a male Indian grey wolf was captured on 10th April 2018 in Telianala of Chengapahad, Hemgiri, Sundargarh Forest Division, Odisha, India.

Fig. 6. Camera trap photo of a male Indian grey wolf was captured on 11th April 2018 in Kodbahal, Hemgiri Range, Sundargarh Forest Division, Odisha, India.

sloth bear (*Melursus ursinus)* and four-horned antelope (*Tetracerus quadricornis)* were also recorded from this study area, highlighting the importance for threatened species conservation. Thus, extensive surveys of these areas are warranted, as they may be a stronghold for threatened species.

Table 1. Records on the occurrence of the Indian grey wolf in Sundargarh Forest Division, Odisha

Sl.	Year	Locations	Forest type	Type of records	Photo captured
1	2018	Ushakothi , Lepripara Range, Sundargarh Forest Division, Sundargarh	Dry deciduous forest	Camera trap	02
2	2018	Jamkani, Lepripara Range, Sundargarh Forest Division, Sundargarh	Dry deciduous forest	Camera trap	02
3	2018	Singharibahal, Hemgiri Range, Sundargarh Forest Division	Dry deciduous forest	Camera trap	02
4	2018	Telianala of Chengapahad, Kanika, Sundargarh, Forest Division.	Dry deciduous forest	Camera trap	03
5	2018	Kodbahal, Hemgiri Range Sundargarh, Forest Division,Sundargarh	Dry deciduous forest	Camera trap	03

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