



Call of conservation: Restoring the population of *Hyaena hyaena* (Linnaeus, 1758) in upper Gangetic plains, India

RITESH JOSHI^{1*}, VAIBHAV SINGH² AND KANCHAN PURI³

¹Conservation and Survey Division, Ministry of Environment, Forest and Climate Change, New Delhi, India

²Lansdowne Forest Division, Kotdwar, Pauri-Garhwal, Uttarakhand, India

³Environment Education Division, Ministry of Environment, Forest and Climate Change, New Delhi, India

*ritesh_joshi2325@yahoo.com

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ABSTRACT

Hyaena hyaena is one of the protected species in India and is listed in Schedule III of the Indian Wildlife (Protection) Act, 1972. However, only few studies have been studied on the aspect of its distribution, ecology and status in India. In the State of Uttarakhand, *Hyaena hyaena* has a patchy distribution, especially across the upper Gangetic plains. Two small populations, consisting of about 15 and five individuals have been recorded from Chilla and Gohri range of Rajaji National Park and Shyampur and Chiriapur range of the Haridwar Forest Division. Besides, 14 dens of striped hyaena have also been documented from the same forests. The movement of hyaena along the long stretch of river Ganges, from Gohri forest of the Rajaji National Park to Chiriapur forest of the Haridwar Forest Division (about 35 kilometers long) indicates that the forests in upper Gangetic plains serve as a potential breeding ground for the species. There is an urgent need to conduct a base-line survey on the distribution and ecology of the species, which includes their past and present distribution, habitat type, movement and range utilization, diet composition, breeding behaviour and success, human interactions in response to environmental pressures. Considering the species on priority in wildlife management planning is also needed for long-term conservation of the species in Uttarakhand.

Key words: Conservation, habitat, *Hyaena hyaena*, Rajaji National Park, upper Gangetic plains

INTRODUCTION

Striped hyaena is listed under Schedule III of the Indian Wildlife (Protection) Act of 1972 (Anonymous, 2017), CITES Appendix III (UNEP-WCMC, 2014), and as Near Threatened in the IUCN Red List of Threatened Species (AbiSaid and Dloniak, 2015). Striped hyaena, *Hyaena hyaena*, encompasses Africa north of and including the Sahel zone, eastern Africa south into Tanzania, the Arabian Peninsula and the Middle East up to the Mediterranean shores, Turkey, Iraq, the Caucasus, Iran, Turkmenistan, Uzbekistan, Tadzhikistan, Afghanistan and the Indian subcontinent, though not reaching Assam (in India), Bhutan or Myanmar (Hofer and Mills, 1998). It has also been presumed that they may have

expanded into Nepal, where they were sighted during 1970s and 1980s (Hofer and Mills, 1998). AbiSaid and Dloniak (2015) have indicated that the global population of *H. hyaena* is below 10,000 mature individuals.

Of the four species of hyaenas found in the world (striped hyaena, *Hyaena hyaena*; brown hyaena, *Parahyaena brunnea*; spotted hyaena, *Crocuta crocuta* and aard wolf, *Proteles cristata*), *H. hyaena* is found in India and remaining three in the African continent. Striped hyaena is widely distributed in India through peninsular India, south of the Himalayas, in arid and semi-arid tracts with the exception of dense forests, true deserts and coasts; however, it is not present in the Western Ghats, or most of Tamil Nadu and Kerala, the North-East and

most of West Bengal (Menon, 2014). Even though, the striped hyaena has an important functional role in maintaining the ecosystem, only few studies have been carried out on its ecology and status, especially on species' population estimation, habitat utilization and food habits (Ilyaraja et al., 2018). As the consequences, there is a lack of reliable estimates on its distribution across most of the Indian ranges. Hofer and Mills (1998) have indicated that the distribution of striped hyaena has been patchy in most of the places, which suggested that it occurs in many small isolated populations. Mills and Hofer (1998) have estimated the population of *H. hyaena* to be over 1000 within India.

Striped hyaena is known for their powerful jaws and teeth, which help them, carry their carrion to their dens. As scavengers, hyenas are known to consume a huge variety of food, including leaves, fruits, insects, fishes, reptiles, birds and mammals (Leakey et al., 1999; Alam and Khan, 2015). The principal food of the striped hyaena consists of the carcasses of animals that have died of disease or been killed by the predators and very often it carries off portions of the body to its den (Blanford, 1888).

In the State of Uttarakhand, striped hyaena is distributed primarily in the Rajaji National Park (RNP) and Haridwar and Lansdowne forest divisions, respectively. Recently, it has also been recorded from parts of Corbett Tiger Reserve (Kalagarh forest) and three territorial forest divisions in Nandhaur valley, e.g. Haldwani, Terai East and Champawat (Gusain, 2014; Belal and Ansari, 2017). Earlier it was assumed that only a small population of this spp. is restricted to the Chilla forest of RNP.

MATERIALS AND METHODS

Rajaji National Park (RNP; 29°51'-30°15' N, 77°52'-78°22' E, 302 to 1000 m amsl) is a crucial wildlife habitat in the Shivalik landscape, forming the north-western limit of the range of Asian elephants, tigers, great pied hornbills and king cobras in the Indian subcontinent. It falls within the Gangetic Plains biogeographic zone and upper Gangetic Plains province (Rodgers et al., 2002), and a major portion of this area is dominated by tropical moist deciduous forest. The dominant

vegetation is *Shorea robusta* (sal), *Mallotus philippinensis* (rohini), *Senegalia catechu* (khair), *Haldina cordifolia* (haldu), *Terminalia bellirica* (bahera), *Ficus benghalensis* (Indian banayan) and *Dalbergia sissoo* Roxb. ex DC (Indian rosewood). The dominant fauna of the park consists of *Panthera tigris* (tigers), *Panthera pardus* (leopards), *Ursus thibetanus* (Himalayan black bears), *Melursus ursinus* (sloth bears), *Muntiacus muntjak* (barking deer), *Nemorhaedus goral* (goral), *Axis axis* (spotted deer), *Rusa unicolor* (sambar) and *Sus scrofa* (wild boars), and among reptiles, *Crocodylus palustris* (mugger crocodile) and *Ophiophagus hannah* (king cobra) were also reported from the park.

While studying the ecology and behaviour of Asian elephants in RNP, some observations were made on the presence of striped hyenas in eastern part of the RNP during June 2009 to May 2010. Direct sighting and indirect evidences like presence of tracks, fresh feeding signs near dens and remains of body parts such hairs were considered for recording the presence of species. Field binoculars (Nikon Action Series, 10 × 50 CF) were used to observe the animals and a Nikon Coolpix 8700 camera was used to produce photographic evidence. Geographical coordinates were recorded using a handheld GPS receiver (Garmin GPS 72).

RESULTS AND DISCUSSION

During the field surveys, direct sightings of the species were made from Chilla and Gohri forest ranges of Rajaji National Park. Within the Chilla forest range, species was recorded from Chilla (29°58'05.2"N, 78°12'42.8"E), Khara (29°54'12.6"N, 78°16'03.5"E) and Rawasan (29°51'35.5"N, 78°19'01.3"E) forests, respectively (Table 1). Within Gohri forest range, the species was recorded from the Dugadda (30°01'16.71"N, 78°24'75.69"E) forest. Besides, observations were also made from the Shyampur (29°89'86.9"N, 78°17'41.4"E) and Chiriapur forests (29°79'81.36"N, 78°20'62.52"E) of the Haridwar Forest Division (HFD), which are contiguous to the eastern part of RNP. A total of (n=14) dens were recorded during the survey periods. The highest number of den (n=9) were collected from Chilla followed by Khara (n=4) and Rawasan (n=1). Most of the dens were found in small hillocks in rocky

terrains. Of the 14 dens, two were left over by the animals. However, dens were not documented from

Gohri forest of RNP and Shyampur and Chiriapur forests of HFD.

Table 1. Sites in Rajaji National Park from where individuals of striped hyaenas were recorded from June 2009 to May 2010.

Sl.	Locality with Coordinates and date	Remarks
1.	Rajaji National Park Chilla forest (29°58'05.2"N, 78°12'42.8"E; 7 November 2009) Khara forest (29°54'12.6"N, 78°16'03.5"E; 14 May 2009) Rawasan forest (29°51'35.5"N, 78°19'01.3"E; 28 March 2010)	Individual from Chilla forest was recorded in the riparian corridor of the river Ganges. However, individuals from Khara and Rawasan forests were recorded near annual/torrential rivers adjacent to the Shyampur and Laldhang forests of Haridwar and Lansdowne Forest Divisions, respectively.
2.	Rajaji National Park Gohri/Dugadda forest (30°01'16.71"N, 78°24'75.69"E; 14 June 2009)	An individual was recorded near boundary of Chilla and Gohri forests, adjoining to the river Ganges.
3.	Haridwar Forest Division Shyampur forest (29°89'86.9"N, 78°17'41.4"E; 18 July 2009) Chiriapur forest (29°79'81.36"N, 78°20'62.52"E; 23 May 2010)	Individuals were recorded from annual/torrential rivers near the river Ganges



Fig. 1. Striped hyaena in Chilla forest of the Rajaji National Park.



Fig. 2. An lone striped hyaena recorded from Shyampur forest of Haridwar Forest Division.



Fig. 3. A den of striped hyaena in Khara forest of Rajaji National Park.



Fig. 4. Footprints of striped hyaena recorded from Rawasan forest of the Rajaji National Park.

Considering the direct sightings of the animals and fresh tracks in different forests, it was estimated that two small populations exist in RNP; (i) which move along the river Ganges, in Chilla and Gohri forests of the RNP and Shyampur and Chiriapur forests of HFD, respectively. This population consisted of about 15 individuals; (ii) the population which moves across the Khara, Luni and Rawasan forests of RNP, respectively, and Laldhang forest of the Lansdowne Forest Division. This population consisted of about five individuals. During the years 1999-2000, the movements of striped hyaenas were recorded across the Chilla-Motichur wildlife corridor. Besides, during the year 2006, tracks of the species were also observed from Dudhia and Ganga Majhara forest beats (small islands in the river Ganges) of the Haridwar and Motichur forest ranges. These observations indicated that nearly two decade back, striped hyaena also used to move across the Haridwar, Motichur, Dholkhand and Kansrao forest ranges of the RNP. However, their movements were rare in the southwestern part of RNP. Since the beginning of year 2000, the movement of striped hyaenas has been found restricted to the eastern part of RNP and adjoining habitats.

Harihar et al. (2010) have indicated about the presence of six to eight individuals of striped hyaena in the Chilla forest of the RNP. Another study carried out on the mammalian fauna of RNP has indicated about the presence of a small population of hyaena (~10 individuals) in the Chilla forest range of RNP (Joshi, 2016). Striped hyaenas are known to occur near human habitations, which facilitate them to feed upon domestic sources of carrion and garbage (Sharma et al., 2011; Tourani et al., 2012; Alam et al., 2014). In all study areas, most of the populations were found residing inside the protected areas. Movement of leopards (*Panthera pardus*) were frequently recorded from all the forest ranges from where striped hyaenas were recorded. Presence of animal and its dens in the eastern part of the RNP and its adjoining habitats is indicating that the population of striped hyaenas is increasing in upper Gangetic plains. Though, the rate of population rise is slow. Considering this study and

the recent documentation of species from some other forest ranges in Uttarakhand State, it can be presumed that the forests in upper Gangetic plains and Terai landscape serve as a potential habitat for the species.

In order to implement the provisions contained in the Indian Wildlife (Protection) Act, 1972, the maximum families of the Gujjars (a nomadic pastoral community), which were residing within the park area were rehabilitated outside the park area has strengthened the frequent movement of wildlife within the park. Since the beginning of the year 2002 onwards substantial increases in the encounter rates of several species were apparent (Joshi, 2017; Ilayaraja et al., 2018). In the year 2015, RNP has been notified as Rajaji Tiger Reserve, which has also strengthened the management and conservation approaches within the landscape.

Increasing development and anthropogenic activities across the riparian corridors of the Ganges, shrinkage of natural water sources inside protected areas, expansion of the road network across a long chain of protected habitats, and lack of awareness among the local people regarding the ecological role of species include some of the threats observed in the study area. Since the region falls within the upper Gangetic plains, which constitutes an important repository for the mammalian fauna, it is proposed that a base-line study be initiated to evaluate the habitats and status of the species. Moreover, ensuring the active participation of local communities in wildlife management planning would be of paramount importance which can be reiterated from a recent study of human-hyaena conflict in Uttarpradesh (Ilayaraja et al., 2018).

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