SHORT COMMUNICATION

RECRODS OF RUSTY-SPOTTED CAT *PRIONAILURUS RUBIGINOSUS* (I. GEOFFROY SAINT-HILAIRE, 1831) (MAMMALIA: CARNIVORA: FELIDAE) IN MOUNT ABU WILDLIFE SANCTUARY, RAJASTHAN, INDIA

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14 December 2020 | Vol. 12 | No. 16 | Pages: 17258–17262
DOI: 10.11609/jott.5969.12.16.17258-17262
Records of Rusty-Spotted Cat *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831) (Mammalia: Carnivora: Felidae) in Mount Abu Wildlife Sanctuary, Rajasthan, India

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**Abstract:** The Rusty-spotted Cat *Prionailurus rubiginosus* is the smallest cat in the world and restricted to the Indian subcontinent. Although it has been recorded across India, its ecology is poorly understood. In the northwestern state of Rajasthan, it has been recorded in the dry deciduous forest landscapes of Udaipur, Sariska, and Ranthambore. We report camera trap records of the Rusty-Spotted Cat in semi-evergreen and dry deciduous forests in Mount Abu Wildlife Sanctuary, Rajasthan. In the current study from September 2017 to April 2018, out of 1,800 camera trapping nights the species was recorded on ten occasions, at four different locations in Mount Abu Wildlife Sanctuary.

**Keywords:** Camera trapping, small wild cat, threatened species.

The Rusty-spotted Cat *Prionailurus rubiginosus* is the world’s smallest cat, endemic to the Indian subcontinent. It was thought to be found only in India and Sri Lanka until its presence was also documented in Nepal (Lamichhane et al. 2016). It is a protected species included in the Schedule I of the Wildlife (Protection) Act 1972 of India (Acharjyo 1998) and listed as Near Threatened on the IUCN Red List of Threatened Species (Mukherjee et al. 2016). The Rusty-spotted Cat population might have declined in the recent past possibly due to habitat changes, hybridization with domestic cats, poaching for trade of skins and predation by feral dogs (Van Gruisen et al. 1992; Menon 2003; Miththapala 2006; Vyas et al. 2018). Several Rusty-spotted Cats were killed in traffic accidents (Tehsin 1994; Digveerendrasinh 1995; Karanth et al. 2008; Behera & Borah 2010; Nayak et al. 2017; Adhikari et al. 2019). Very little is known about the home range and population dynamics of this elusive cat (Miththapala 2006; Nayak et al. 2017; Adhikari et al. 2019; Bora et al. 2020).

The Rusty-spotted Cat has been reported in various regions, spanning a wide range of habitats in the country. These include the foothills of the Himalaya in Jammu & Kashmir, the Terai region, Deccan Plateau, Eastern Ghats, Western Ghats, and the semi-arid landscape of Gujarat & Rajasthan (Chakraborty 1978; Digveerendrasinh 1995; Mukherjee 1998; Dubey 1999; Manakadan & Sivakumar 2006; Patel 2006; Pillay 2008; Anwar et al. 2010; Aditya & Ganesh 2016). Its presence has also been documented near human habitations and agricultural fields (Nowell & Jackson 1996; Mukherjee 1998; Dubey 1999; Athreya 2010).

Two-third of the state of Rajasthan is under desert cover; in arid and semi-arid parts the main forest type is thorn forest, and tropical dry deciduous forest occurs in...
hilly terrain (Sharma et al. 2013). In this state, the Rusty-spotted Cat has been reported near Udaipur (Tehsin 1994; Bhatnagar et al. 2000), in Sariska Tiger Reserve (Mukherjee 1998) and in Ranthambhore Tiger Reserve (Dharmendra Khandal in litt. 2013). One Rusty-spotted Cat carcass was found on a highway near Ramgarh-Vishdhari Wildlife Sanctuary in 2014 (Nayak et al. 2017).

**STUDY AREA**

Mount Abu Wildlife Sanctuary covering an area of 326.14km$^2$ is situated in Rajasthan’s Sirohi District bordering Gujarat (Fig. 1) in the southern part of the Aravalli Hills (Verma 2011). Elevation ranges from 300m at the foothills to 1,722m at Guru Shikhar, the highest peak of the Aravalli Hills. The dominant forest type is semi-evergreen on higher elevations and dry deciduous forest in the foothills (Champion & Seth 1968). Mount Abu is the only hill station in Rajasthan and harbours a unique biodiversity including few endemic species (Sharma et al. 2013). The flora of Mount Abu consists of 112 plant families, comprising 449 genera and 820 species (Mehta 1979). The Sloth Bear *Melursus ursinus* is abundant in the sanctuary while Leopard *Panthera pardus* is the apex predator (Verma 2011). Due to its geographical features and elevation, the climate is cool with a high average annual precipitation above 1,500mm in contrast to 470mm average annual rainfall in Rajasthan (Sharma et al. 2013; Verma 2011). The temperature ranges from -5°C in winter to 35°C in summer in higher elevations and from 7°C to 42°C in the foothills (Verma 2011).

**MATERIAL AND METHODS**

In order to establish a scientific management practice in Mount Abu Wildlife Sanctuary, camera trapping surveys were implemented to determine the diversity of species and their distribution pattern across the landscape. Cuddeback 1279 20 mega-pixel trail cameras were deployed across different elevation zones and habitat types in the sanctuary. They were installed
40–50 cm above ground and at a distance of 2–3 m away from the trails used by wild animals to record both large and small animals. The time interval between two consecutive photos was set to 10 seconds and were active for 24 hours. They were monitored routinely to retrieve data and check batteries.

We determined grids with cells of 2x2 km² and deployed one camera trap per cell. The cells were selected based on criteria such as accessibility of terrain, presence of animal signs and representative ‘Beats’, i.e., the smallest management units for different habitat types. Coordinates were determined using a handheld GPS (Garmin eTrex 20x) device set to datum WGS 84.

In the first session, sampling was carried out in elevation zones above 800m from September 2017 to December 2017 using 10 camera traps. In the second session from January 2018 to April 2018, the survey was extended to elevations below 800m (Table 1).

We define an occasion as a single image recorded in a particular location in the study area.

**RESULTS**

The total survey effort during the study was 1,800 camera trap days. The Rusty-spotted Cat was recorded on ten different occasions at four camera locations (Table 2). Out of these, it was recorded in nine occasions at elevations above 800m in semi evergreen forest patches, and once in dry deciduous forest in lower elevations. It was recorded in an open forest area in a small valley at Palanpur Point trail located at 1,211m (Image 1). On Tiger Path track, it was recorded on five occasions (Image 2). The surrounding area was open undulating landscape with moderately dense undisturbed forest on both sides, dominated by *Mangifera indica*, *Erythrina suberosa*, and *Ficus glomerata* with undergrowth mainly consisting of *Lantana camara*. The area is situated in close proximity to a small hamlet named Sitavan. It was recorded on three occasions near Aarna Village on a wildlife track that is often used by humans (Image 3). This terrain and forest area is similar to the previous location, except the anthropogenic disturbance was higher due to the proximity of the village. Also, it is noteworthy that four different Leopards were recorded in this area. The fourth locality record in Achpura, situated in the lower foothills is a dry deciduous forest with *Anogeissus pendula* as dominant tree species. Apart from the Rusty-spotted Cat, the Leopard was commonly recorded, and the Jungle Cat *Felis chaus* on a couple of occasions. The details of the camera trap records are provided in Table 2. In addition, one adult female Rusty-spotted Cat (Image 4) was found injured, probably hit by a vehicle on 14 April 2018 near human habitation in Sunset area at an elevation of 1,159m. It was treated by the local veterinarian in Mount Abu but eventually succumbed to injuries.

**Table 1. Details of camera trapping survey design used in the study.**

<table>
<thead>
<tr>
<th>Survey session</th>
<th>Extent of study area and elevation range</th>
<th>Survey effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>September to December 2017</td>
<td>10 cells from 800–1,722 m</td>
<td>600 camera trap days</td>
</tr>
<tr>
<td>January to April 2018</td>
<td>30 cells from 300–1,722 m</td>
<td>1,200 camera trap days</td>
</tr>
</tbody>
</table>

Image 1. Rusty-spotted Cat at Palanpur Point trail on 10 September 2017. © Rajasthan Forest Department. Note the time format was incorrectly set to PM instead of AM.

Image 2. Rusty-spotted Cat at Tiger Path on 10 January 2018. © Rajasthan Forest Department.
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Discussion

Our records of the Rusty-spotted Cat in Mount Abu Wildlife Sanctuary are among the highest elevation records in India to date. In Udanti-Sitanadi Tiger Reserve located in Chhattisgarh, Central India, it was recorded up to elevations of 924m in dry deciduous mixed forests (Basak et al. 2018). Nimalrathna et al. (2019) reported records in Horton Plains National Park in Sri Lanka at an elevation range of 2,084–2,162 m in a mosaic of grasslands and forest patches. To date, Mount Abu Wildlife Sanctuary is the southwestern most protected area in Rajasthan, where the Rusty-spotted Cat was recorded. About 85km aerial distance farther east, a Rusty-spotted Cat kitten was sighted in Sajjangarh Wildlife Sanctuary in 2006 (Sharma 2007). Farther south, Vyas et al. (2007) reported sightings of Rusty-spotted Cats in dry deciduous forest patches outside protected areas in northeastern Gujarat. Our records corroborate findings in other study areas that the Rusty-spotted Cat preferably inhabits forested areas and is foremost nocturnal in nature (Patel 2011; Basak et al. 2018; Nimalrathna et al. 2019; Bora et al. 2020). In Mount Abu Wildlife Sanctuary, multiple records in the areas around Tiger Path and Aarna imply the importance to sustainably manage these undisturbed forest habitats for the long-term viability of the Rusty-spotted Cat population. The detection of the species on only 10 occasions may be due to the wide spacing of camera traps and the limitation in survey effort. A more extensive camera trapping survey over a longer period and using smaller cells may shed more light on the Rusty-spotted Cat population in the sanctuary.

Dry and moist deciduous forests seem to provide prime habitat for the Rusty-spotted Cat (Mukherjee et al. 2016). Its presence in Mount Abu Wildlife Sanctuary warrants surveys in neighbouring protected areas of the Aravalli Hills such as Jessore Sloth Bear Sanctuary, Balaram Ambaji Wildlife Sanctuary, and Phulwari Ki Nal Wildlife Sanctuary to determine connectivity to population units in Gujarat. A comprehensive survey across the landscape using camera trapping in combination with radio telemetry and scat analysis is important to improve understanding of the Rusty-spotted Cat’s ecology, in particular regarding its

Table 2. Details of camera trap records of the Rusty-spotted Cat in Mount Abu Wildlife Sanctuary.

<table>
<thead>
<tr>
<th>Date and time</th>
<th>Camera location</th>
<th>Other wildlife recorded at these locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.x.2017, 10.53h</td>
<td>24.585°N &amp; 72.703°E; 1,211m at Palanpur Point Trail</td>
<td>Indian Grey Mongoose Herpestes edwardsi, Indian Hare Lepus nigricollis, Asian Palm Civet Paradoxurus hermaphroditus</td>
</tr>
<tr>
<td>10.i.2018, 20.32h; 21.i.2018, 02.11h; 30.i.2018, 03.38h; 01.ii.2018, 22.06h</td>
<td>24.568°N &amp; 72.725°E; 1,178m at Tiger Path</td>
<td>Leopard, Sloth Bear, Sambar Rusa unicolor, Indian Grey Mongoose, Ruddy Mongoose H. smithii, Asian Palm Civet Viverricula indica, Indian Crested Porcupine Hystrix indica, Indian Hare, Grey Junglefowl Gallus sonnerathi</td>
</tr>
<tr>
<td>28.i.2018, 20.33h; 31.i.2018, 04.56 h; 1.ii.2018, 19.27h</td>
<td>24.565°N &amp; 72.749°E; 1,143m in Aarna Beat</td>
<td>Leopard, Sloth Bear, Sambar, Striped Hyaena Hyaena hyaena, Asian Palm Civet, Small Indian Civet Viverricula indica, Indian Crested Porcupine, Indian Grey Mongoose, Ruddy Mongoose, Indian Hare, Grey Junglefowl</td>
</tr>
<tr>
<td>15.iv.2018, 02.22h</td>
<td>24.605°N &amp; 72.810°E; 370m in Achpura Beat</td>
<td>Sloth Bear, Asian Palm Civet, Indian Grey Mongoose, Indian Hare</td>
</tr>
</tbody>
</table>


Image 4. Rusty-spotted Cat found injured near Sunset Point on 14 April 2018. © Hemant Singh.
movement and space use pattern, diet, reproduction, response to anthropogenic factors and identification of threats to its survival. This baseline information will form the basis for developing a robust strategy for its conservation.

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