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SHORT COMMUNICATION

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Observations on the Nilgiri Marten *Martes gwatkinsii* (Mammalia: Carnivora: Mustelidae) from Pampadum Shola National Park, the southern Western Ghats, India

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Abstract: We present herewith some natural history information such as social behavior, aggressive behavior, vocalization, food and feeing, basking and allo-grooming, time activity pattern etc. on the Nilgiri Marten *Martes gwatkinsii*, the endemic and threatened mustelid of Western Ghats. The conservation recommendations were also suggested for the long-term conservation of the Nilgiri Marten.

Keywords: Basking and allo-grooming, food and feeding, Kerala, Idukki, mustelid, social behavior, time activity pattern, vocalization.

Of the two species of martens in India, the Nilgiri Marten *Martes gwatkinsii* is known from southern India. The Nilgiri Marten is one of the most elusive mustelids and is endemic to the Western Ghats (Wirth & van Rompaey 1991; Mudappa 2013). This species was formerly considered a subspecies of *Martes flavigula* (Corbet & Hill 1992), but subsequently has been separated as a valid species (Rozhnov 1995; Wozencraft 2005). The Nilgiri Marten is the largest Indian mustelid, has a head to body length of 50–70 cm, with a relatively smaller tail, having a length of 35–50 cm, and weighs about 1–3 kg. The pelage is dark brown with rufous brown shoulder, which extends up to the mid body. It has a distinct lemon-yellow throat patch. The tail is bushy and blackish-brown (Larivière & Jennings 2009).

The Nilgiri Marten is listed as Vulnerable because its global population is estimated to be below 1,000 mature individuals (Mudappa et al. 2015). The Nilgiri Marten is also listed in Schedule II Part II of the Indian Wildlife (Protection) Act, 1972, and has been placed on Appendix III of CITES.

The Nilgiri Marten has been recorded from 23 localities from the three southern states of India, namely Kerala, Karnataka and Tamil Nadu (Balakrishnan 2005; Kumara & Singh 2007; Krishna & Karnad 2010; Sreehari

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& Nameer 2013). It has been photo-documented in tea and other plantations adjoining forests in the Anamalai Hills (Anoop 2013; Mudappa et al. 2015) and it has been recorded across a wide range of elevations from 300–2,600 m. Although the species is known from a few locations, most of its distribution range still lacks exploration. We report the sightings of the Nilgiri Marten from Pampadum Shola National Park (PNP) in the southern Western Ghats.

Study Area

The PNP is located at 10°07'–10°10'N and 77°14'–77°17'E in the Munnar Wildlife Division, Idukki District, Kerala (Fig. 1) and extends 1.318km^2 (Anonymous 2016). The vegetation of the park consists mostly of southern montane wet temperate forests (shola) and southern montane wet temperate grassland (grasslands). The terrain is undulating with an altitudinal range from 1,600–2,400 m.

The PNP is contiguous with Kurinjimala Wildlife Sanctuary (KWS) on one-half of the northern side, while the other half of the northern boundary is shared with Vattavada region of Marayur Sandal Forest Division, Idukki District, Kerala (Fig. 1). Thus, these protected areas provide habitat continuity between the Grass Hills and Palni Hills. The habitat of the PNP is primarily shola forests while the western side has plantations of black wattle *Acacia mearnsii,* eucalyptus *Eucalyptus grandis*, and pine *Pinus caribaea*. The grasslands are seen on the upper reaches of the National Park. The Old Munnar-Kodaikanal inter-state road connecting Kerala and Tamil Nadu states passes right through the middle of the National Park.

Methods

A study was conducted in PNP between October 2013 and October 2015. Weekly visits were made to PNP (N=148 days) and observations on the Nilgiri Marten were made from dawn to dusk. On an average 10 hours were spent in the field during every field visit, altogether 1,480 hours were spent in the field. Most of the encounters with the Nilgiri Marten hardly lasted for one minute or less, however, on a few occasions, the encounter lasted up to 3 minutes (SD= 0.33). We recorded the number of individuals, activity, and behavior of the Nilgiri Martens.

Results

The population of Nilgiri Marten at Pampadum Shola National Park

There were 42 independent sightings of Nilgiri Martens during the study (Table 1). They were sighted between the altitudes of 1,685–1,909 m. The distribution map of Nilgiri Marten from Pampadum Shola National Park is given in Fig. 1. Most of the sightings, however, were from the higher altitude range (44%) at PNP (Fig. 2). We sighted them as pairs on 18 occasions and as triplets on six occasions.

We recorded double noted *"KI... KI-KI..."* sound being produced by the Nilgiri Martens. The first note was a single note, while the second was a double note. This vocalization was observed when the triplets were traveling together and when a young one was out of sight of the parents and the sound continued until the young marten joined the parents. Thus, this could be the contact call between the parents and the offspring (Images 1, 2, 3 & 4).

Scat of the Nilgiri Marten: A fresh Nilgiri Marten dropping is dark brown in colour, which turns ashy-grey when it gets older (Image 5). They have latrine sites, where they deposit the droppings regularly. On an average, the scats measured 90–100 mm in length and have a diameter of 20–30 mm. On a detailed examination of the scats, it was found that 90% consisted of undigested hairs, nail, and bones probably of small mammals, and also had seeds.

Time activity pattern of Nilgiri Marten: The martens were seen resting on a fallen tree trunk, and were also found indulged in allo-grooming for up to 3 min. They were found to be active from dawn to dusk, however, the peak hours of activity were between 09:00–11:00 hr and again from 15:00–17:00 hr.

Diet of Nilgiri Marten: During the present study, we observed a Nilgiri Marten pair, chasing and killing an Indian Chevrotain *Moschiola indica*. There are earlier reports of *Moschiola indica* in the diet of Nilgiri Marten (Larivière & Jennings 2009). Nilgiri Martens were found to be feeding on a variety of seeds and fruits too.

Discussion

Some natural history information on the Nilgiri Marten is presented here. The study revealed that the Nilgiri Martens have been detected more in higher altitudes. On 45% encounters, the Nilgiri Martens were sighted as pairs, while on 14% occasions they were seen as triplets. This is contrary to the current understanding of the social behavior of Nilgiri Marten, where it is primarily considered as a solitary animal (Larivière & Jennings 2009).

The 42 sightings of Nilgiri Martens, during a span of 148 days highlights the significance of this tiny protected areas as an important habitat for this elusive species.

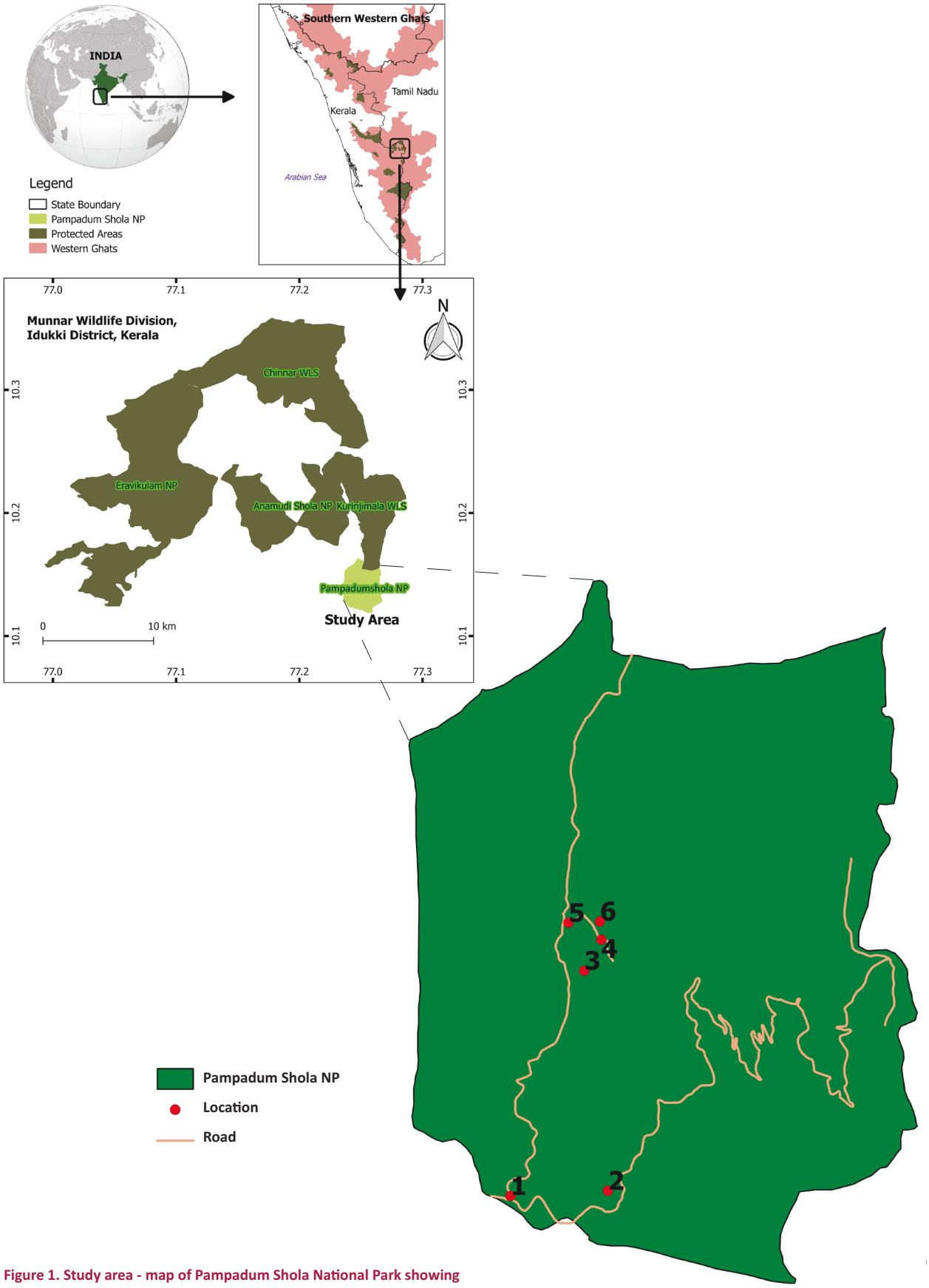

Figure 1. Study area - map of Pampadum Shola National Park showing the distribution of Nilgiri Marten

Table 1. Sightings of the Nilgiri Marten at Pampadum Shola National Park

Date	Time	Number of individuals	Altitude (m)	The number corresponds to the location in the map
10.x.2013	17:40	3	1900	1
11.x.2013	18:00	2	1900	1
12.x.2013	16:15	2	1850	1
13.x.2013	7:34	3	1685	5
4.xi.2013	6:15	1	1910	1
4.xi.2013	8:15	1	1750	3
4.xi.2013	8:40	3	1685	5
16.xi.2013	15:00	2	1753	4
20.xi.2013	7:10	1	1910	1
21.xi.2013	11:00	1	1850	1
28.xi.2013	10:00	3	1901	1
30.xi.2013	9:30	2	1687	6
30.xi.2013	14:25	2	1747	5
30.xi.2013	14:35	2	1685	6
30.xi.2013	17:07	2	1753	4
1.xii.2013	10:05	1	1687	5
21.xii.2013	15:30	1	1900	1
22.xii.2013	10:22	1	1900	1
30.i.2014	8:30	2	1753	6
2.ii.2014	10:30	2	1747	5
25.ii.2014	10:00	1	1900	1
27.ii.2014	16:00	2	1900	1
3.vi.2014	16:00	1	1754	6
18.vi.2014	17:00	1	1850	1
26.vi.2014	8:40	2	1900	1
26.vi.2014	18:30	2	1900	1
27.vi.2014	6:15	2	1900	1
12.vii.2014	16:22	2	1685	5
23.viii.2014	6:37	1	1898	6
24.viii.2014	16:10	1	1909	3
14.ix.2014	15:50	2	1800	6
3.x.2014	6:20	3	1903	3
4.x.2014	10:20	1	1900	3
10.xii.2014	10:00	3	1900	3
11.i.2015	16:10	2	1757	6
14.iii.2015	17:30	2	1818	6
17.iv.2015	15:20	1	1757	6
30.iv.2015	16:45	1	1685	5
8.v.2015	7:12	1	1980	2
19.vii.2015	9:20	2	1843	6
21.viii.2015	15:05	1	1902	3
24.x.2015	17:40	2	1811	6

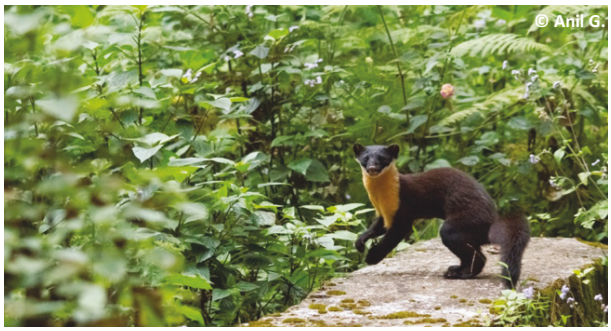

Image 1. A solitary Nilgiri Marten *at* Pampadum Shola National Park

Image 2. A Nilgiri Marten pair at Pampadum Shola National Park

Image 3. A rare photograph of Nilgiri Marten triplets at Pampadum Shola National Park

Image 4. A Nilgiri *Marten* pair showing the difference in the colour of the iris

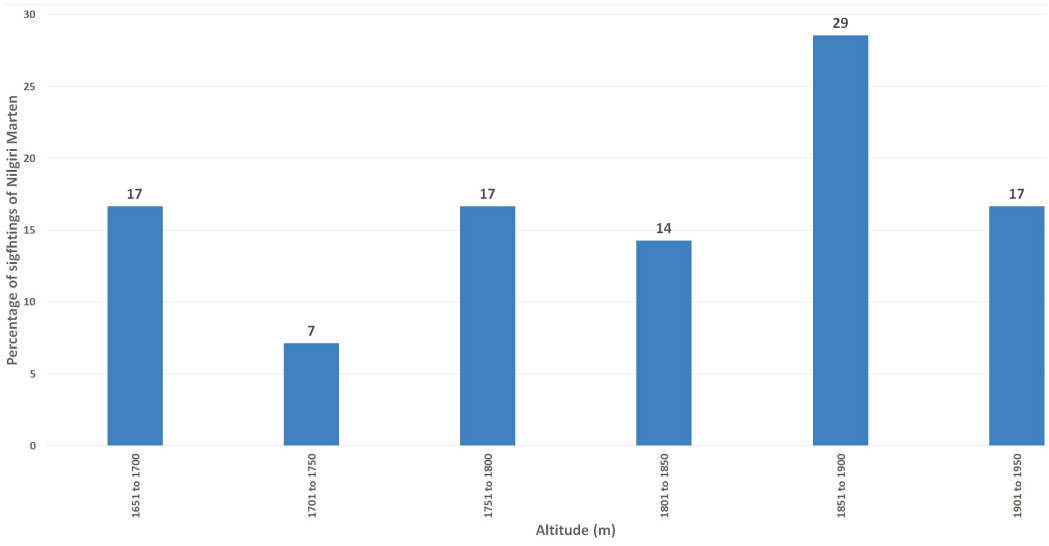

Figure 2. The altitude at which the Nilgiri Martens were sighted from Pampadum Shola National Park

Image 5. The scat of the Nilgiri Marten *Martes gwatkinsii* in Pampadum Shola National Park

The contiguity of this protected area with the adjacent landscapes including the Kurinjimala WS, Anamudi Shola NP, and Eravikulam NP in Kerala side and the Grass Hills in Tamil Nadu side, may act as a suitable landscape for several taxa, including the Nilgiri Marten.

Some parts of PNP are planted with Black Wattle *Acacia mearnsii*, which could be affecting the habitat quality. A public road which connects Munnar town to the villages north of the park passes through the middle of this national park in a north-south direction. The Old Munnar-Kodaikanal Road, which is non-operational now, also passes through the national park. Ecotourism initiatives that are being implemented at the Nilgiri Marten ranges require careful planning and regular reviews on its impacts on the Nilgiri Marten and other taxa. It is also suggested to undertake detailed ecological studies on this lesser known animal across its range.

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