

An update on the distribution of yellow-throated marten *Martes flavigula* in Nepal

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Abstract

The yellow-throated marten *Martes flavigula* is encountered frequently by many researchers or nature guides but the information remains unavailable to the wider scientific community. The conservation efforts are already stretched thin and the species being Least Concern in the IUCN Red List of Threatened Species points to the reality that a dedicated budget for studying its ecology and distribution will not be readily available. We try to amend this data gap by presenting a non-targeted survey of the yellow-throated marten from May 2013 to January 2020 recorded during the field work in the mid hills and mountains of Nepal. The species was reported from 22 different sites which includes five protected areas of Nepal. Among them, we reported the species for the first time from Dhorpatan Hunting Reserve and districts of Achham, Bajura and Gulmi. We recommend a guideline to be developed for recording the opportunistic sightings and encourage researchers to share their records that will improve understanding of yellow-throated marten distribution in Nepal.

Keywords: Mustelidae, Opportunistic sightings, Photographic evidences, Small carnivore, Yellow-throated marten

1 | Introduction

Yellow-throated marten *Martes flavigula* is the largest among the old-world martens (Mallick 2013). It is distributed through western Asia and Siberia with widespread distribution in South, South-east and East Asia (Sathyakumar 1999, Chutipong et al. 2015). The species inhabits tropical rainforests, subtropical foothills and temperate to alpine habitats in the Himalayas (Appel 2013, Appel & Khatiwada 2014). In Nepal, the species is mainly found below 3,254 m above sea level (asl) and recorded from Annapurna Conservation Area (CA), Chitwan National Park (NP), Khaptad NP, Langtang NP, Makalu Barun NP, Rara NP, Sagarmatha NP and Shuklaphanta NP (Jnawali et al. 2011). Even though, the species is widespread in the Terai region (Jnawali et al. 2011, Lamichhane et al. 2014), Appel and Khatiwada (2014) have recorded the species at an elevation of 4,510 m in the alpine meadow in the Kanchenjunga CA, the highest elevation record for this species in the world.

Yellow-throated marten is categorized as Least Concern nationally as well as globally (Jnawali et al. 2011, Chutipong et

al. 2015) as a result of its widespread distribution with presence in many protected areas, large population, occurrence in many heavily degraded sites and the lack of identification of major threats. However, it has been speculated that some of island-endemic species might be threatened (Chutipong et al. 2015). Even though the population of yellow-throated marten is estimated to be stable, poaching for fur and habitat loss are the major threats to the species in Nepal (Jnawali et al. 2011). Globally, population of the species is declining, however, the species is quite resilient to widespread threats of forest deterioration along with intensive non-selective ground-based traps. Hence, it is deemed unlikely to be declining much more than the background rate of deforestation (Chutipong et al. 2015). Yellow-throated marten is a voracious predator and its diet consists of a wide variety of food ranging from vertebrate, invertebrates, fruits, food waste and even human corpses have been speculated (Pierce et al. 2014, Parr & Duckworth 2007). In Chitwan NP, the species has been witnessed to carry small Indian civet *Viverricula indica*, although it was unclear whether it was killed or scavenged (Lamichhane et al. 2014) and insects such as

wasp (the scat content) (Shrestha & Basnet 2005). Despite its widespread distribution in Nepal, relatively little is known about its distribution, ecology and behavior, particularly in its tropical range (Lamichhane et al. 2014), or rugged landscapes (Appel & Khatiwada 2014). Although the species is frequently encountered by many researchers or nature guides, this information are not made available to the wider scientific community as opportunistic surveys are not given much importance. We have presented a non-targeted survey of this species during different field visits in Nepal and hope that this study aimed at bridging the data gap of the species.

2 | Materials and methods

Direct sightings of the yellow-throated marten are presented here. These sightings were opportunistically (non-targeted survey) collected from May 2013 to January 2020 during the field work in the mid hills and mountains of Nepal. Date, time and geographic coordinates were gathered from information embedded in the photo details or from reviewing the field notes. In most of the sites, geographical coordinates and elevations were taken from the Garmin Etrex 10. General information of species recorded habitats were noted along with the general behavior of the species.

3 | Results

Yellow-throated martens were encountered on at least 22 locations in 22 different incidences with 35 individuals from Makalu Barun NP in the east to Achham district in the west (Fig. 1 & Annex 1) in the mid hills and mountains of Nepal. Of those 35 sightings, twelve sightings were recorded singly, seven sightings in duos while groups of three were recorded in three sightings. We recorded species from an elevation of 885 m in Kaski district to 3,504 m in the Khumbupasanglahmu Rural Municipality (RM) inside the Sagarmatha NP. Among all the sightings, eight sightings were within the protected areas (4-locations in Annapurna CA, 1-Dhorpatan Hunting Reserve, 1-Makalu Barun NP, 1- Sagarmatha NP and 2-Shivapuri Nagarjun NP). Moreover, six sites were located within the Kathmandu valley, mostly in the southern hills of Kathmandu district.

The species was reported for the first time from Gulmi, Bajura and Achham district and Dhorpatan Hunting Reserve. The species was recorded in diverse habitats; shrubby areas, human dominated landscapes, dense forest, abandoned land as well as

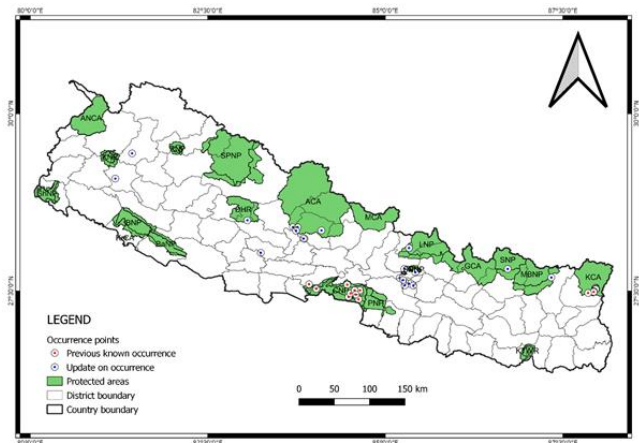


Figure 1. The occurrence of Yellow-throated Marten in Nepal. Previous known occurrences obtained from Appel and Khatiwada (2014) and Lamichhane et al. (2014).

riverine belts. In Bhotkholra Rural Municipality (RM) of Sankhuwasabha district and Kakani Municipality, the species was found feeding on the fruiting trees of *Gagun Saurauia napaulensis* while in Madi RM, two individuals were seen chasing the Indian hare *Lepus nigricollis* though whether the hare was caught or not was not determined.

The activity density functions revealed that yellow-throated marten activities start in the morning and evening with major activities peak occurring at 09h00 to 10h00 but considerably drop in the afternoon to peak again in evening between 17h30 to 18h30 (Fig. 2).

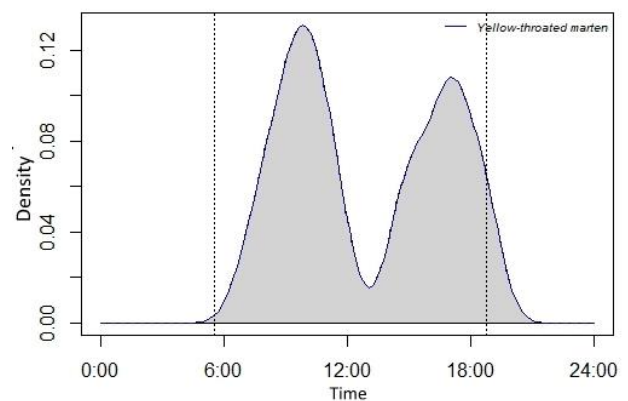


Figure 2. Estimated activity patterns for yellow-throated marten species

4 | Discussion

Our opportunistic sightings with proper documentation will improve understanding of yellow-throated marten distribution and will be helpful in reassessment of conservation status of the species in future. Even though such data have flaws with regards to unequal sampling effort, this information can be vital for

updating the distribution of the species (Okes & Riain 2019). We believe that our sighting will be helpful for wildlife managers to minimize the conflict caused by the species as it is renowned as a chicken depredator in many parts of rural villages in Nepal. Grassman et al. (2005) reported no previous ecological study of the species and its diet remains little-studied or based on opportunistic observations. Our two sightings on the feeding on the fruits of *Saurauia napaulensis* plant added a new plant-based diet of the species. Of the 18 sightings of the species in Namdapha Tiger Reserve, 50% of the sighting were witnessed while feeding on the fig plants and/or while lurking to nab frugivorous birds visiting the fig plants (Naniwadekar et al. 2013). Moreover, the species is generally considered to be voracious predators (Pierce et al. 2014), and our observation on chasing Indian hare supports the fact that it feeds a wide variety of wild animals. In western part of Nepal, the yellow-throated marten was seen in the cheer pheasant *Catreus wallichii* habitat and it is one of the main natural predators of cheer pheasant threatening its survival (Basnet 2016).

5 | Conclusions

Present study has provided an update on the distribution of yellow-throated marten in Nepal. The study presents the first recordings from Achham, Bajura and Gulmi districts and Dhorpatan Hunting Reserve. This opportunistic sighting can provide important information on the species presence and further ecological studies are recommended. The opportunistic sighting data has its flaws yet they can provide reliable information and broaden the scope of ecological inquiries. Therefore, recording habitat type, general behavior, GPS location, elevation, date and time are highly recommended as such information can provide low-cost information about the spatio-temporal distribution of the species.

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Authors' contributions

Basnet, H. collected the primary data; Rai, A. conducted literature review and both the authors contributed in the preparation of the manuscript and gave final approval for publication.

Conflicts of interest

Authors declare no conflict of interest.

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Annex 1. Records of yellow-throated marten *Martes flavigula* in various parts of Nepal with dates, time, elevation, habitat and coordinates from north to south. Note: M- municipality; RM- Rural Municipality

S.N	Location	Latitude N	Longitude E	Elevation	Date	Time	Record type	Habitat
1	Godawari M (Lalitpur)	27.6040	85.3315	1,444	4-Feb-2017	09h27	Direct Observation, photograph	vegetation dominated by <i>Castanopsis indica</i> , <i>Choerospondias axillaris</i> (Lapsi), <i>Ficus</i> sp., <i>Myrica esculenta</i> , <i>Prunus cersoides</i> , <i>P. paschia</i> (Mayal), <i>Oak Quercus glauca</i> (Sano falant), <i>Schima wallichii</i> etc.
2	Chandragiri M (Kathmandu)	27.6848	85.2045	1,695	2-Jul-2014	18h37	Direct Observation	<i>Schima wallichii</i> Forest
3	Madi RM (Kaski)	28.3547	84.1008	1,945	13-Mar-2016	09h54	Direct Observation	Shrubland/grassland above the Sikles village, chasing the Indian hare (probably)
5	Gokarneshwor M (Kathmandu)	27.7634	85.4236	1,416	16-Jan-2016	09h49	Direct observation/ photograph	Abandoned land
6	Dakshinkali M (Kathmandu)	27.6269	85.2772	1,753	16-Dec-2016	15h13	Direct Observation	Pine dominated Forest
7	Dakshinkali M (Kathmandu)	27.5805	85.2742	1,208	13-Apr-2017	11h19	Direct Observation	Bank of Bagmati River
8	Badimalika RM (Bajura)	29.4400	81.4352	1,820	16-May-2016	17h51	Direct observation/ photograph	Pine Forest
9	Gosaikunda RM (Rasuwa)	28.1070	85.3346	2,936	10-Dec-2014	15h20	Direct observation/ photograph	Abandoned Farmland
10	Khumbupasanglah mu RM (Solukhumbu)	27.8112	86.7237	3,504	15-Oct-2015	10h27	Direct observation/ photograph	Rocky area
11	Annapurna RM (Myagdi)	28.4007	83.6998	2,858	-17Aug-2016	14h29	Direct Observation	Rhododendron, Black Juniper, Spurce, Deodar
12	Annapurna RM (Kaski)	28.3987	83.7660	2,668	19-Dec-2016	17h17	Direct observation/ dead	Black Juniper, Blue Pine, Spurce, Deodar
13	Annapurna RM (kaski)	28.3503	83.7430	1,524	31-Jan-2015	07h16	Direct observation	Abandoned farmland, shrubby area
14	Chandragiri Municipality (Kathmandu)	27.6552	85.2510	1,630	10-Feb-2018	10h16	Direct observation	Pine Forest with shrubland
15	Resunga Municipality (Gulmi)	28.0400	83.2472	1,490	8-Dec-2016	16h43	Direct observation	Farmland
16	Kakani M (Nuwakot)	27.8136	85.2674	2,050	15-Sep-2017	08h06	Direct observation	Feeding on unknown fruits nearby Human settlement
17	Bhotkhola RM (Sankhuwasawa)	27.6915	87.3378	1,967	7-Nov-2019	17h05	Direct observation/ photograph	Mixed forest, feeding on fruits
18	Dhorpatan RM	28.4974	83.0578	3,105	8-May-2013	18h38	Direct observation	Scattered dwarf pine forest
19	Pokhara Lekhnath MC	28.2388	83.8621	855	3-Jan-2020	11h26	Direct observation/ photograph	Small stream nearby human settlement
20	Pokhara Lekhnath MC	28.2391	83.8485	995	4-Jan-2020	08h23	Direct observation	Farmland
21	Godawari M (Lalitpur)	27.5779	85.3955	2,283	21-Apr-2018	9h14	Direct observation/ photograph	Oak and Quercus forest
22	Mangalsen M (Achham)	29.0854	81.1986	1,915	23-May-2014	16h23	Direct observation	Pine dominated Forest