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New records of snakes in Tura Peak of West Garo Hills, Meghalaya, India

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ABSTRACT

Intensive surveys of snakes have been carried out in Tura Peak of Meghalaya from January 2012 through December, 2013 to uncover the snake diversity in the study area. Field observations were made from 06.00 hrs to 18.00 hrs for diurnal snakes and 18.00 hrs to 21.00 hrs. for nocturnal snakes. Active Searching Methods (ASM) was used for the collection of data as per IUCN Reptilian survey methods and line-transact method was also used. Six different footpaths leading to Tura Peak Reserve forest were carefully surveyed for opportunistic chances of encountering different snake species which inhabited in the Tura Peak Reserve forest. Three new records of snakes were made during survey viz., *Oligodon nikhili* , *Oligodon kheriensis* (family: Colubridae) and *Trimeresurus medoensis* Zhao(family: Viperidae). Those species have been recorded for the first time in Tura Peak Reserve Forest of West Garo Hills and as well as from entire Meghalaya State of Northeast India.

Key Words: Snake, Active search, New Records, Tura Peak Reserve Forest, West Garo Hills.

INTRODUCTION

India supports extremely rich snake diversity within Southeast Asia. Amongst 3150 species of snakes living on earth, 275 species are known from India, whereas, 102 species of snakes have been recorded from Northeast India (Ahmed et *al.*, 2009). In Northeast India, the fauna of Meghalaya has greatly influenced by the Indo-Chinese elements. Again, in Meghalaya, a part of Northeastern States, regarded as one of the mega biodiversity hotspot areas in the world. In Meghalaya alone, altogether 56 species of snakes have been recorded by Zoological Survey of India, Shillong (Fauna of Meghalaya, 1995). Most of the reptilian study of Meghalaya has been pioneered and persecuted in the early 18th century by the British Naturalists while serving in the then Indian Medical Service (IMS) or the Indian Forest service (IFS). However, many of the snakes were collected and documented during British period and as well as much later by other Indian workers. The Pioneers of snake discovery and diversity were mainly contributed by Gray (1831, 1834-1835), Gunther (1858, 1860, 1864, 1868, 1875), Jerdon (1870), Schlegel (1837, 1839), Dumeril and Bibron (1854), Blyth (1854), Kuhl (1820), Dauden (1803), Boulenger (1888,1890,1894,1899), Peters (1864), Schneider (1799, 1801), Lacepede (1789), Boie (1827), Sclater (1891), Linnaeus (1758), Wall (1907-1908,1910,1921), Nutphand (1971), Shaw (1802), Gmelin (1789), Blanford (1878), Anderson (1879), Slowinski *et al*. (2001), Cantor (1839), Gray & Hardwicki (1835), Gray (1853), Hallowell (1860), Kramer (1977), Lesson (1831), Reinhardt (1844), Shaw & Nodder (1797), Smith (1937 & 1940), Zhao (1977) and David *et al.* (2002). Gradually, serious workers have started building up the edifice of the Indian Herpetology systematically between the year 1998-2008 and leading to discovered 353 new species in the Eastern Himalayas, equating to an average of 35 new species every year. Out of 353 new species discovered from the regions, 16 were reptiles.

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Regarding natural vegetation, the actual forest cover of Meghalaya is about 15,657 km^2, indicated 69.8% of the total geographical area of the state and the total area of the forest recorded was 9496 km^2 i.e. 42.34 per cent (as per FSI, 1997). Garo Hills, the part of Meghalaya is covered by tropical forest and thus provide suitable home for many living creatures like snakes. Apart from Zoological survey of India Shillong branch, no survey has been carried out in the state of Meghalaya since last 33 years. However, there is a lacuna of intensive survey of snake species in any part of Garo Hills district till the present survey. Thus, the main aim of this research was to uncover the different snake species inhabiting in Tura Peak Reserve Forest of Meghalaya.

STUDY AREA

Meghalaya, the part of mega biodiversity regions of the world has covered an area of about 15,657 km^2. Garo Hills is situated in the Western part of Meghalaya adjacent to Assam, West Khasi Hills and Bangladesh. Tura Peak Reserve Forest of west Garo Hills of Meghalaya lies between 25°00′ and 26°10′N latitude and 89°45′ and 92°45′E longitude and a height of about 873m msl . It has green forest cover with an area of 3.94 Km^2 and located about 5.64 km away from eastern part of Tura Town. It consists of lower Gondwana rocks formed by pebble bed, sandstones and carbonaceous shale with streaks and lenses of coal. The most important physio-geographic feature of Garo Hills are the Tura Range and Arbela Range which are running parallel in an East-West alignment, extending from Tura to Siju and Simsang Valley. Tura range is one of the most important mountainous ranges in West Garo Hills as there are many mountain peaks which are located in this range. These are Tura Peak, Nokrek Peak, Meminram Peak, Nengminjok Peak, Chitmang Peak, Balpakram Hills and Dura Banda. Tura Peak is standing next to Nokrek peak (Nokrek Biosphere Reserve) and it is the pride of Tura town. Tura Peak has many small undulating hills on its side, small streams, three rivulets Rongkhonchi, Gandrakchi, Chitoktak and two beautiful waterfalls Rengsangrap and Gangrakdare. It has semi-evergreen tropical forest. It has many huge rocks and stones, stiff slope and valleys. About 250m high above, the place known as Makrekidam (Monkeys Toilet) is exists and about 300-400m high up from Makrekidam, the place Chipu Ware(Snakes Valley) is situated, where large numbers of snake species are present as per elderly people. Many Biologists have explored Nokrek Peak (Nokrek Biosphere Reserve) and Balpakram hills (Balpakram National Park) owing to rich biota. Though Tura Peak has its own scenic beauty for the people of Tura Town but the reptile faunas are neglected by most of the Biologists (Figure1; Plate-1).

Study area has fairly high temperature for most parts of the year (from March-October) with August as the hottest month having the mean maximum and minimum temperature is 24.3°C and 17.8°C respectively (Temperature record for Meghalaya, 1978-1981). Average annual rainfall is about 2,689mm, of which more than two-third are received from the month of May-August.

METHODS

Survey of snake was carried out in Tura Peak of West Garo Hills, Meghalaya from January 2012 through December, 2013 to uncover the snake diversity in the study area. Data of snakes were collected through Active Searching Methods (ASM), as described by IUCN Reptilian survey methodology and line-transact methods (Heyer *et al.,* 1993). Six different forest trails leading to Tura Peak Reserve Forest were selected for opportunistic chances of encountering the different snakes which harbour in the Tura Peak reserve forest. The forest trails used for survey of snakes of Tura Peak Reserve Forest were Chitoktak, Upper Chandmary, Upper Babupara, Nikranga.ding, Boldaka.ding and Boldorengre. Most of the day snake survey was done during first half of the day (9:00 hrs-12:00 hrs) and second half of the day (13:00 hrs -15:00 hrs) owing to activeness of the diurnal snakes. Active searched method was carried out at night hours (18:00 hrs.- 21:00 hrs.) for nocturnal snakes, as the nocturnal snakes were active after 18:00 hrs. We have used search light with an input of DC. 7.5 V 500 mA to search the snakes. There were many venomous and as well as non-venomous snakes found in Tura Peak. Thus, precautions were taken for any unforeseen dangers during survey. Booths and gloves were used after 18:00 hrs to 21:00 hrs. to reduce any accidentally stumbling over our feet on snakes. To capture live snakes, long wooden poles fitted onto ‘Y’ or metal sticks were used.

One snake of each species was photographed and collected from study area for scientific study. Same species was not captured twice, but the numbers of snakes encountered were noted down. The captured snakes were measured with the help of measuring tape and their morphological characters were studied and their identifications were confirmed with the help of literature (Whitaker & Captain, 2004).

RESULTS

New records

Two species of snakes from the family Colubridae and one species from family Viperidae have been recorded for the first time in Tura Peak Reserve Forest of West Garo Hills and as well as in Meghalaya state of Northeast India. *Oligodon nikhili* was recorded for the first time in Tura Peak Reserve Forest of West Garo Hills of Meghalaya on the forest track after 31 years of its first record at Palni Hills of South India (Whitaker & Dattatri, 1982) and it was the first record in Meghalaya as well as In North-East India. *Oligodon kheriensis* (Acharji & Ray, 1936) was recorded for the first time in Tura Peak Reserve Foresr of Meghalaya and was found near Rongkhon stream about 30 metres away from Rengsangrap falls. The species *Trimeresurus medoensis* Zhao (Zhao & Jiang, 1977) was first uncovered from Upper Babupara in Tura Peak from a house located at the forest edge. It was the first record not only from Tura Peak Reserve Forest of West Garo Hills but also for the entire state of Meghalaya.

1. Nikhil's Kukri Snake- *Oligodon nikhili* (Whitaker & Dattatri, 1982):

Oligodon nikhili was first reported by Whitaker and Dattatri in 1982 from a small patch of rain forest near Shembaganur. It was also reported from Palode Reserve forest in Kerela by Arun Kanegavel on 15 January 2013. After 31 years, we have found this snake species from Top Chitoktak (Co-ordinates: N 25°31′12.8″ & E 90°14′22.9″) at 639 m altitude under Tura Peak Reserve forest near the forest track which looked fresh as if it has just emerged after ecdysis. When we encountered, it was shaky and its tail was shivering. It was found on 8-8-12 at 17.45 hrs in the evening. It measured 670 mm and the other adult 1093 mm in length from snout to tip of tail. Another juvenile was found killed on a forest track in Tura Peak reserve forest on 20-7-13 at 15.30 hrs. The species identification was confirmed by observing the characters. The Head was slightly broader but appears almost equal in size to the neck. It has typical 'A'shaped mark on its head. The eye had black and round pupil. There was a black patch just below the eyes which was obliquely placed. It had light brown dorsal scales with four chocolate brown stripes; the upper two stripes more distinct and runs from the base of ' A' shaped head markings through the body till the tip of the tail. Outer two small stripes begin slightly further back which were partly broken and end at base of tail. The tail was short and stout but had pointed tip. The underside of juvenile was white, on its either side the ventral scales were slightly reddish with brown edges. It was harmless and does not attempt to strike like other snakes. It had reddish tongue. We have encountered only five snakes of the same species in the study area (Plate-1: a, b & c).

2. *Oligodon kheriensis* (Acharyi & Ray, 1936):

Oligodon kheriensis was first found in Kheri Division of Uttar Pradesh, India and another one was found in Mahendranagar in Western Nepal. It was also reported from North West Bengal in Jalpaiguri District in India. After 77 years of its description in India, the species was first sighted and recorded on 30-9-13 at 20.24 hrs from beside the rocks near the Rongkhon stream (co-ordinates: N 25°31′39″ & E 90°13.75′03″) at an altitude of 765 m near Rengsangrap Falls. It was captured with the help of long pole which wss attached to a 'Y' shaped metal rod and its measurement taken was 1.15 m SVL. It could crawl very fast. It could also twist and turn its body making a knot around the stick as though it has captured its prey but it never has taken out its tongue. It could bite but non-venomous; though the site of the bitten part was swollen nothing serious symptom was observed. It was a beautiful snake with coral red in colour. The scales were smooth and glossy but have few, small indistinct brown patches which were scattered unevenly. The head was not broader than the neck. There was indistinct arrow mark present on the head. The snout was very short and rounded. The eyes were small and the pupils were rounded. There was a small slanting brown bar crossing through the eye and runs to the upper jaw which was prominent. The ventral side was reddish orange and has small black spots on either side which were alternately placed on ventral scales. The posterior part on the ventral side, the reddish colour was prominent towards the tail region. The tail was short and stumpy but tapers towards the tip. We have encountered only

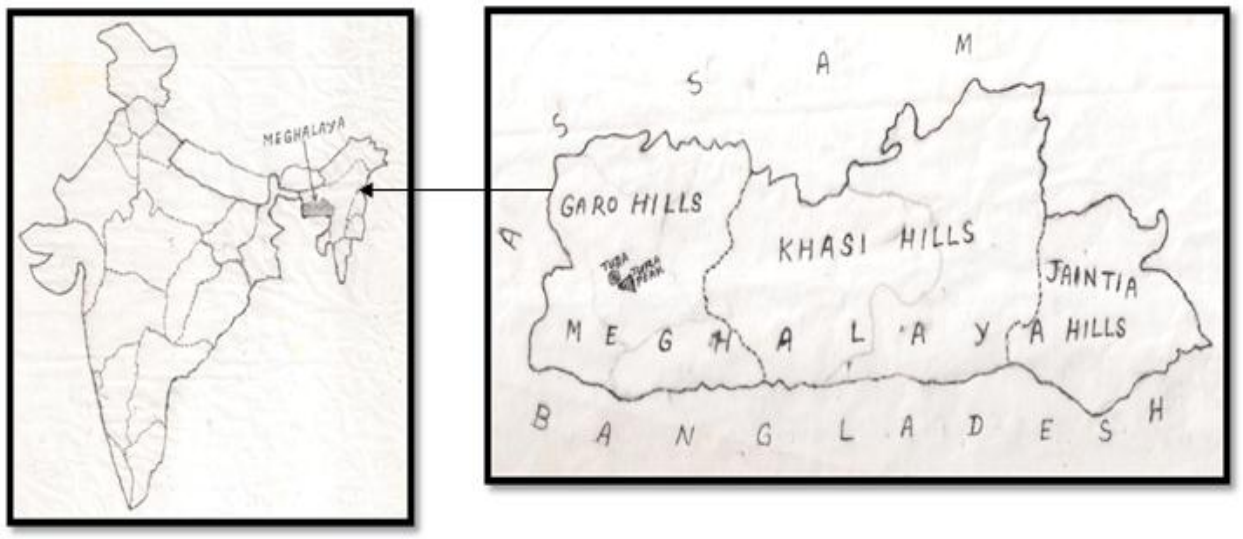

Fig 1. Location map of Study area showing the Tura Peak.

Fig. 2: a. Patch of Tura Peak Reserve Forest, **b**. Rengsangrap waterfalls in the mid-zone of Tura Peak Reserve Forest, **c**. Survey habitat of snakes in Tura Peak Reserve Forest.

Plate 1:a.Anterior part of *Oligodon nikhili* b. *Oligodon nikhili* just emerge after ecdysis c. Adult *Oligodon nikhili* d. Adult *Oligodon kheriensis* and e. Ventral side of *Oligodon kheriensis* .

Plate 2:a. *Trimeresurus medoensis* (Garo Local Name: Chipbu wacheksi)

Table 1: Body length and Microhabitat use by Snake species recorded in Tura Peak Reserve Forest.

Sl. No.	Scientific Name	SVL	Microhabitat use	Number encountered (N)
1	*Oligodon nikhili* (Whitaker & Dattatri, 1982)	1093 mm	Forest edges, shrubs and near the residential areas.	5
2	*Oligodon kheriensis* (Acharyi & Ray, 1936)	1150 mm	Below the bushes and shrubs near the stream.	2
3	*Trimeresurus medoensis* (Zhao & Jiang,1977):	650 mm	Residential area near forest edge.	1

Table- 2: Abundance of three snake species in six different study zones (transacts) of Tura Peak Reserve Forest of West Garo Hills, Meghalaya.

Sl N.	Family/ Sc. Name	Individuals encountered in transacts					
		T_1	T_2	T_3	T_4	T_5	T_6
1	Colubridae:*Oligodon nikhili*	1	1	1	2	0	0
2	*Oligodon kheriensis*	0	0	1	1	0	0
3	Viperidae: *Trimeresurus m. medoensis*	0	0	0	1	0	0

two individuals of the species during our entire study periods (Plate-1: d & e).

3. Medo Pit Viper-*Trimeresurus medoensis* (Zhao & Jiang, 1977):

It was first reported in Arunachal Pradesh near Gandhigram village. The species *Trimeresurus medoensis* (Zhao & Jiang, 1977) was recorded for the first time from Upper Babupara (Co-ordinates: N 25°31.40′4′′ & E 90°12.14′1′′) of Tura Peak reserve forest at 697 m msl height from a house residing close to the forest. It was photographed from inside the house around 22.30 hrs. The species was killed by the owner of the house. The species was first sighted from a thatch house on 7-7-12 which was probably searching for rats or house lizards for food. It measured 650 mm from snout to tip of tail. We have encountered only one of these kinds during our survey period. We have confirmed the species identification from its morphological characters with the help of literature. Head was triangular in shape and broader than the neck. The scales on upper surface of head were small and smooth when touched. The eye was yellowish green with black pupil which was placed vertically. The dorsal portion of the head and body were dark green like the bamboo leaf with dark blue skin between scales. The lip and belly scales were green like paddy field. The dorsal and ventral shades were separated by red stripe below and white stripe above. Tail short and strongly prehensile which was more or less reddish brown above (Plate-2 : a).

DISCUSSIONS

Although the species *Oligodon nikhili* (Whitaker & Dattatri, 1982) was found in the Southern India, it was quite interesting to uncover the same species in the North-Eastern region of India. The habitat was also remote hilly terrain of Tura Peak Reserve Forest of West Garo Hills, Meghalaya. It was very mild and harmless snake and does not attempt to strike when caught. This snake species may be common in the study area as five numbers were encountered during survey. *Oligodon kheriensis* (Acharyi & Ray, 1936) was a rare species in Tura Peak as we have encountered only two individuals in the whole of two years (2012-2013) of our survey. It was a restless snake. It had bitten when caught but, it was mildly poisonous snake. Medo Pit Viper *Trimeresurus medoensis* (Zhao & Jiang, 1977) was very rare in the study zones as we have tried our best to search for another specimen in order to get better photography of this snake but did not get any chance. Few people residing near the forest edge informed us that, during evening hours, the Medo Pit Viper snake entered inside their houses in searched of rats/ houses lizards which they have killed several times. But, we could not confirm whether the snake species killed by the local people was actually *Trimeresurus medoensis*, or not. Many of the snakes which were photographed; were killed by local people from their residential areas and sometimes found entering inside their houses and gardens while clearing the weeds. As snakes love to devour rats they are actually

helping to get ride off rodents which indirectly help the farmers to keep granaries and rice fields free of rats. However, these scaly creepy creatures are considered as bad omen by many people and they are killed instantly wherever they are sighted. Therefore, Wildlife Department and Forest Department should take care of it and should not allow any indiscriminate killing of snakes, since they are a vital component of our ecosystem and being colourful it adds beauty to nature. .

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External Links:

1. The reptile database: Oligodon kheriensis. Acharyi & Ray, 1936.

2. www.indiansnakes.org. Oligodon kheriensis.