



New records of amphibian fauna from Tura Peak reserve forest, West Garo Hills district, Meghalaya, Northeast India

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ABSTRACT

Intensive survey has been carried out from January 2012 to December 2013. The data of amphibians were collected using Active Searching Methods during dark hours, but some amphibians were diurnal and also seen during day hours. Thus, the survey activity was performed from morning 06.00hrs to 21.00hrs. Most of the specimens were collected using handpicked methods and live photographs were also taken using Digital SLR Camera, Canon EOS 1100D model. All the specimens were measured and morphological characters were studied for identification. Observed amphibians species were released back to their natural habitat after identification, photographic records and necessary measurements. Only representative amphibian specimens were collected whenever necessary and preserved it into 10% formaldehyde. Altogether six different species of amphibian fauna have been newly recorded from Tura Peak Reserve Forest of West Garo Hills District, Meghalaya of Northeast India. Those were such as *Xenophrys boetgerri*, *Xenophrys major*, *Xenophrys zunhebotoensis*, *Xenophrys glandulosa*, *Amolops monticola* and *Theloderma asperum*.

Key Words: New records, Amphibians, Tura Peak reserve Forest, West Garo Hills, Meghalaya, Northeast, Active searching method.

INTRODUCTION

India is incredibly rich in species diversity. About 138 species of amphibians are endemic to India (Maiti & Maiti, 2011). The amphibians in India are largely confined to highly diversified habitats of the Western Ghats and North-East region (Inger & Dutta, 1986). From North-East India 105 amphibian species have been reported (Ahmed *et al.*, 2009). The richest expression in diversity and abundance of amphibians of the Northeast India is met with in the state Meghalaya as evidence from the accounts of amphibian by Boulenger (1890, 1920), Kripalani (1961), Yazdani & Chanda (1971), Pillai & Yazdani (1973, 1977, 1979, 1980) and Sahu & Khare (1983). In Meghalaya alone there are 33 species of amphibia under six families

and eleven genera (ZSI, 1995). So, the present survey for amphibian species in Tura Peak Reserve Forest of West Garo Hills might even help to record more of different amphibian species of Meghalaya.

STUDY AREA

Meghalaya or “Home of Cloud” is one of the important states of Northeastern region of India and a part of the mega biodiversity area of the world. It has actual forest cover 15,657 km² 69.8% of the total geographical area) but the recorded forest area is about 9496 km² (42.34% (FSI, 1997). Garo Hills is situated on the Western part of Meghalaya and

bounded on the North-West and North by Assam, East by West Khasi hills district and South and the South West by 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. The original name of Tura is *Durama Imbama*, the name of goddess who looks after the mountain. Total area of the Tura Peak Reserve forest is around 3.94 km² with a height of about 983m msl. It is located 5.6 km away from the eastern part of Tura town (Samson, 2006). It is a

most important part of Tura range of Garo hills running through East –West alignment, extending from Tura, west Garo hills to Siju and South Garo hills. Tura Peak is stands next to Nokrek Peak or Nokrek Biosphere reserve that supports large numbers of biodiversity components.

Tura peak supports tropical moist deciduous forest mixed with some evergreen species (Ray & Alam, 2002). It has two beautiful waterfalls-Rongbangdare and Rengsangrap. It has many small streams without names and three streams -

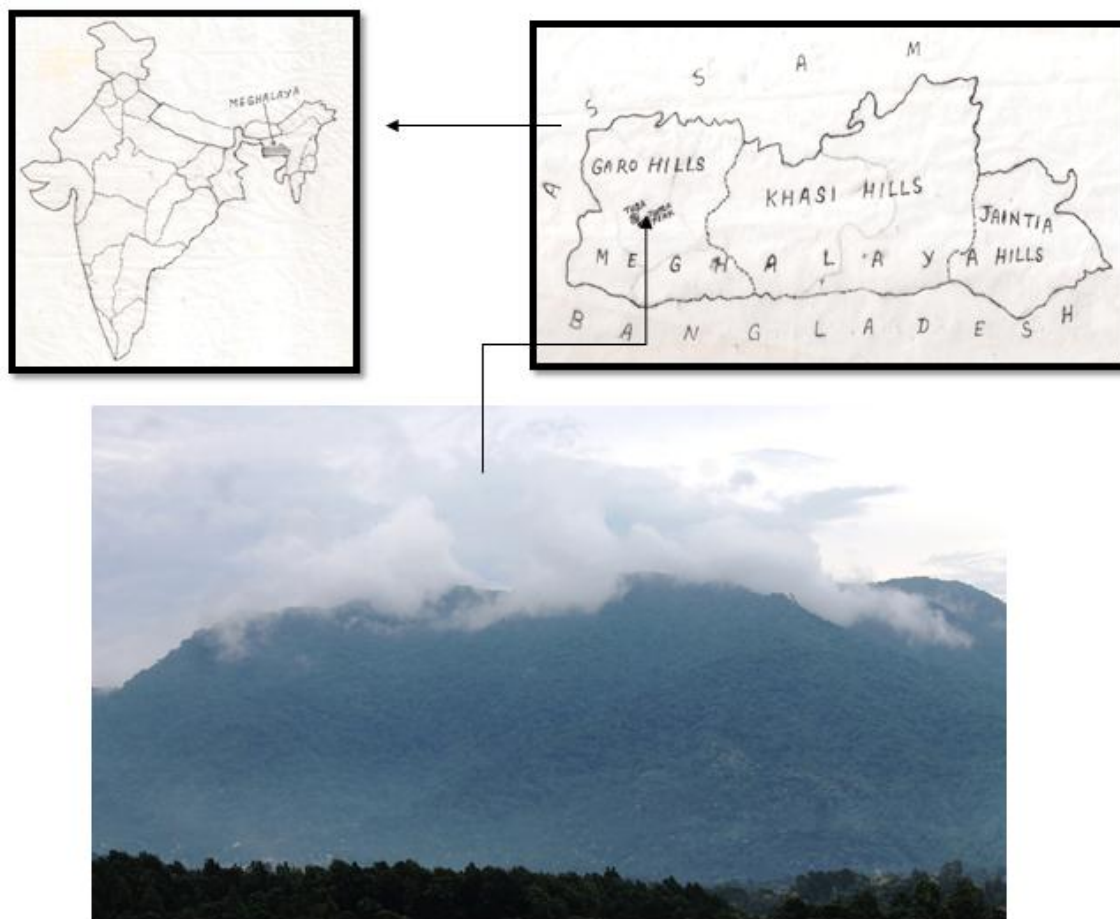


Fig 1. Sketch map of Meghalaya and Garo Peak study area of Meghalaya.

Chitoktak, Gandrak, Rongkhon which are strewn with huge boulders and stones. All these three streams are flowing down from Tura peak popularly known as “Tura A.bri” by the Garos. Since, it has small streams surrounded by huge trees, small trees, shrubs, herbs, climbers and patches of bamboo, it is a good site for inventorying of amphibian species and studying its micro-habitat. The entire area under Garo hills was organized as single administrative district in 1873 and Tura as its Headquarter. In October 1979, the district was bifurcated into two districts; West Garo Hills and East Garo Hills. South Garo Hills came into existence on 18th June 1992 after the division

of West Garo Hills District of Meghalaya. At present it has five districts; East Garo hills, West Garo hills, North Garo Hills, South Garo Hills and South-west Garo hills. There are three important mountain ranges in these districts. They are (1) Tura Range (2) Arbella Range and (3) Ranggira Range. Tura range is one of the most important ranges in west Garo hills. There are many mountain peaks located in this range. They are Tura Peak, Nokrek Peak, Meminram Peak, Nengminjok Peak, Chitmang Peak, Balpakram Hills and Dura banda. Many Biologists have explored Nokrek Peak (Nokrek Biosphere Reserve) and Balpakram hills (Balpakram National Park) as it is rich in both flora

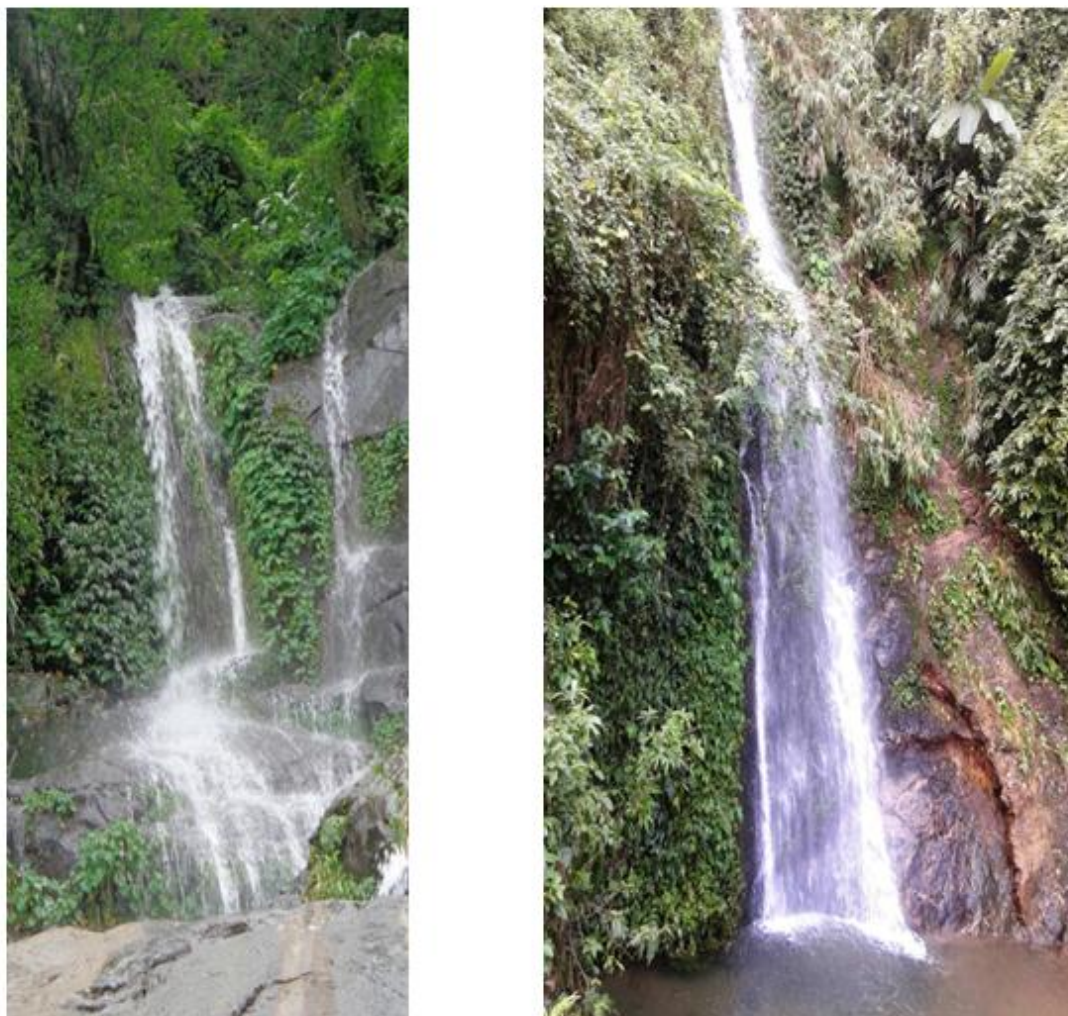


Plate-1: Photographs shows the (a) Rengsangrap Waterfalls in the mid-zone of Tura Peak Reserve Forest and (b) Gandrakdare Waterfalls on the foot of Tura Peak Reserve Forest.

and fauna. Tura Peak has its own charm and beauty for the people of Tura Town but neglected by Biologists. So, we have chosen Tura Peak as our study area.

It has a fairly high temperature for the most part of the year, i.e. from March to October with August as the hottest month having the mean maximum and mean minimum as 24.3°C and 17.8°C respectively (Temperature record for Meghalaya, 1978-1981). It has average annual rainfall about 2689mm of which more than two-thirds are received in the four months, May to August. It has lower Gondwana rocks consists of pebble bed, sandstones and carbonaceous shale with streaks and lenses of coal.

Methods of study

Intensive survey of amphibian species has been carried out from January, 2012 through December 2013. The data of amphibians were collected using systematic sampling survey and active searching method, as described by IUCN amphibian survey

methodology. To achieve the expected goal, several visits were made in different localities of the study area such as Chitoktak, Upper Chandmary, Upper Babupara, Nkranga.ding and Boldaka.ding. The amphibians were either aquatic, terrestrial or arboreal, all the collections were made in different habitats such as streams, side of streams, sandy soil, decaying logs, inside certain holes on trees, bamboo leaves, tree stumps, fern leaves, moist soil, shaded forest ground, under dead leaves, under big boulders the sampling areas were designed as per the habitats. Most of the amphibian surveys were done after dark (18.00 hrs) but certain amphibians are diurnal and it could be seen during the day time. Thus, 16 hrs field surveys were made from morning 06:00 to 12:00hrs and afternoon 13:00 to 16:00 hrs and from evening 16:00 hrs till night 21:00 hrs. During survey at night, search light have been used with an input of DC 7.5v 500mA. Most of the amphibian specimens were collected using handpicked methods, but some of them were also collected using small hand-made nets attached

to 1.50m handle, specially prepared for the purposes. The captured live specimens were photographed with Cannon Camera Model-EOS 1100D with EFS 18-55mm Image stabilizer Macro 0.25m/0.8ft. Its Snout to vent Length (SVL) was carefully measured with Digital slide Caliper Model No. 6"/150mm and its morphological characters were studied for species identification with the help of published literature. The microhabitat of each species were observed, locality, altitude (using Garmin GPS) and date of collections were noted down. Single specimens from each genus was collected and preserved in 10% formalin and kept carefully for future references in Biodiversity Museum of Gauhati University whereas, the other studied specimens released back into their own natural habitat. All the observed specimens were represented using tabular form.

RESULTS AND DISCUSSION

New Record from Meghalaya

We have uncovered altogether 14 species of amphibian fauna in Tura Peak reserve forest, of which, 12 species were newly recorded from entire Meghalaya state. Those were such as *Xenophrys boettgeri* (Boulenger, 1899), *Xenophrys glandulosa* (Fei, Ye & Huang, 1991), *Xenophrys major* (Boulenger, 1908) and *Xenophrys zunhebotoensis* (Mathew & Sen, 2007) under Megophryidae family, the species *Theloderma asperum* (Boulenger, 1886) under the family Rhacophoridae, the species *Hylarana erythraea* (Schlegel, 1837), *Fejervarya teraiensis* (Dubois, 1984), *Occidozyga borealis* (Annandale, 1912), *Polypedates maculatus* (Gray, 1838), *Amolops monticola* (Anderson, 1871) and *Polypedates assamensis* (Mathew & Sen,

Table-1: A. Body length and microhabitat use by newly recorded amphibian fauna in the study area.

Scientific name/Family	Common Name	Vernacular Name	Length (cm)	Microhabitats	No. encountered
Megophryidae: <i>Xenophrys boettgeri</i>	Pale-shouldered Frog	Diplok Brimchang	8 cm	Wooded forest, shaded ground.	3
<i>Xenophrys glandulosa</i> (Fei <i>et al.</i> , 1991).	Glandular Horned Toad	Diplok Nokma	13 cm	Side of streams, forested area.	9
<i>Xenophrys major</i> (Boulenger, 1908)	Major's Horned Toad	Diplok Miksim	7.5 cm	Among dried leaves not far from streams.	8
<i>Xenophrys zunhebotoensis</i> (Mathew & Sen, 2007)	Zunheboto's Horned Toad	Diplok Mikchak	8.5 cm	Shaded forest grounds.	1
Ranidae: <i>Amolops monticola</i> (Anderson, 1871) /	Mountain Cascade Frog	Gandrak Rongbrin	10 cm	Wet rocks and stones, side of streams.	23
<i>Amolops marmoratus</i> (Blyth, 1855)	Marbled Frog	Gandrak Sambeng	7.5 cm	Near the streams & moist rocks.	15
<i>Odorrana chloronata</i> (Gunther, 1876)/	Green-Backed stream Frog	Gandrak janggil-tangsek	6 cm	Moist rocks just below the fast flowing streams.	35
<i>Rana erythraea</i> (Schlegel, 1837).	Leaf Frog	Bengblok Okbok	7.5-8.5 cm	Moist sandy ground not far from streams.	11
Rhacophoridae: <i>Polypedates assamensis</i> (Mathew & Sen, 2009)	Dappled Tree Frog	Gandrak Bolrichong	6.5 cm	Near the trees and tree-stumps.	3
<i>Polypedates maculatus</i> (Gray, 1838),)	Common Tree Frog	Gandrak Kobok	8 cm	Bamboo leaves, trees.	25
<i>Theloderma asperum</i> (Boulenger, 1886).	Pied warty Tree Frog	Gandrak Gingbok	2 cm	Mossy rocks, hollow trees.	7
Dicroglossidae <i>Fejervarya teraiensis</i> (Dobois, 1984)/	Terai Warty Frog	Bengblok An.te	7-8 cm	Hill streams, on rocks & stones.	46
<i>Occidozyga borealis</i> (Annandale, 1912)	Northern Trickle Frog	Bengbrek Chonte	4 cm	Near the side of streams, under stones.	19

2009). Whereas, two species *Odorrana chloronata* (Gunther, 1876) and *Amolops marmoratus* (Blyth, 1855) were recorded for the first time in Tura Peak Reserve Forest of West Garo Hills District (Table 1).

Description of the Species

1. Pale-shouldered Frog -*Xenophrys boetgeri* (Boulenger, 1899)

The species was not reported from any part of Meghalaya till date. It was found in Arunachal Pradesh and Sikkim in India and also in China. *Xenophrys boetgeri* Boulenger was found for the first time in Tura Peak Reserve Forest of West Garo Hills District of Meghalaya after 114 years. During present survey, the species was first sighted on 14-10-13 at 18.18 hrs from below a huge tree among the leaf litters from Tura Peak (N 25°30'18.2" & E 90°14'35.1") at an elevation of 834 m above sea level. It was also found in Top Chitoktak. It was photographed and its characters were observed and latter identified with the help of literature. Its length was measured 8 cm SVL. The head is broader than long. It has triangular chocolate colour pattern bordered with white in between the eyes. It has obtuse or blunt snout with nasals placed on lateral side. It has small black pupil which slightly appears vertical with golden brown iris. The supra-tympanic fold is well distinct and the tympanum is smaller than the diameter of eye. The dorsal skin is grey with unsymmetrical chocolate colour pattern bordered with white which joins one side of triangular pattern from the head. It has one "V" shaped glandular fold on the dorsal and a pair of incomplete, discontinuous dorso-lateral gland on either side of the body. Towards the rear side of the dorsum there is a semi-circle gland which looks like an inverted 'U'. There are few elongated warts with deep brown small patches scattered on the flank. The entire body skin including the limbs has small tubercles all over. The lower jaw has three white patches on either side. The ventral side has small and large white, grey, brown and chocolate patches. Fingers and toes are long and slender without webbing. Tibio-tarsal articulation reaches the tip of snout. We have encountered 3 numbers only during our three years search (Plate-2: a&b).

2. Major's Horned Toad-*Xenophrys major* (Boulenger, 1908)

Xenophrys major (Boulenger, 1908) was recorded for the first time from Tura Peak Reserve Forest of Meghalaya after 105 years. It was found in the other states of Arunachal Pradesh, Assam, Mizoram and Nagaland in North East India. It was also found in other countries like Bangladesh, China, Hongkong, Myanmar and Vietnam. It was first sighted on 27-9-13 at 13.23 hrs from Tura

Peak Reserve Forest (N 25°31'10.3" & E 090°13'51.8") at an altitude of 845 m. It was found among the leaf litter under shaded ground on the heavily wooded area about 50-100 metres away from Rongkhon stream. It was captured and measured 7.5 cm SVL. It was photographed and its characters are observed and allowed to go back in its own natural habitat. It had broad head with a triangular pattern in between the eyes. The pupils are rhomboidal but vertically placed. The iris is reddish brown. The eyes are large and jutting out above the head. The snout is broadly pointed and the nostrils are closer to the eyes. The loreal region is concave and the upper lip is dirty white or grey. A dark band from tip of snout to shoulder along the eye and the tympanum is small but distinct. In between the eyes there is a triangular pattern followed by "Y" shaped which joins to a small inverted 'v' shaped pattern. There is a dorso-lateral gland on either side of the body. There are about 5-7 yellow spots on the flanks. The throat has dark band extending to the shoulder. In between the dark band there is small and big irregular shaped white spots on reddish brown background. There is a pair of white spots on the chest. There are seven globular dark grey patches on the breast which are arranged in a flowery pattern one in the centre and six surrounding it. Many indistinct globular grey patches can be seen scattered all over the belly which has pink and light yellow abdominal skin. On either side of the belly there are large irregular longitudinal dark grey blotches. The underside of the thigh is yellowish with small white warts. The forelimbs have light grey bands and fingers are free with rounded flattened tips. Toes one fourth are webbed. Tibio-tarsal articulation is reaching beyond the snout. We have encountered 8 numbers (Plate-3:a&b).

3. Zunheboto's Horned Toad *Xenophrys zunhebotoensis* (Mathew & Sen, 2007)

The species *Xenophrys zunhebotoensis* Mathew & Sen is the first record from Tura Peak Reserve Forest of West Garo Hills District of Meghalaya after its discovery in 2007 by Mathew and Sen. It was first sighted on 27-9-13 at 14.35 hrs from Tura Peak (N 25°30'56.5" & E 090°30'19.2") at an elevation of 845 m. It was captured and measured 8.5 cm SVL. It was photographed and its characters were observed and then identified and confirmed as Zunheboto's Horned Toad. The head was broader than long. Snout was obtusely pointed. Loreal region was concave. Nostril was almost equidistant to the eye and the snout. Tympanum was not distinct. The eyes are black and rhomboidal but vertically placed. The iris was reddish brown. The eyes were large and prominent and jutting out above the head. The supratympanic glandular fold was cream coloured and distinct which curve onto the anterior region of the



Plate- 2: a. *Xenophrys boetgerri* (side view)

tympanum. The dorsal surface was smooth which have slaty brown skin. It had a dark triangular pattern in between the orbit. It had a broad incomplete 'V' shaped ridge behind the eyes and another inverted 'v' shaped ridge on the posterior side showing the imprint of hourglass pattern on the dorsum. The forelimbs were slender and the fingers are long and free without web. There were black patches on the elbow and below the forelimbs. Even the fingers have small black spots. The hindlimbs were long and slender. The legs have indistinct brown bands and have black blotches and black spots on the dorsal part of thigh which were well distinct. The tibio-tarsal articulation reached the middle region of the eye. The toes were free without web. The tips of toes were slightly swollen which were grey in colour. Two parallel lines one on either side between the 'V' shaped ridges. There were 5-7 yellow spots on the flanks and two black spots bordered with yellow colour. On the lower jaw there were three white elongated patches which were transversely placed. The throat and the chest have almost the same colour like the dorsum but have rounded blotches. The abdomen and the thigh are off white which have white small warts scattered uniformly all over. It lifts the hind limbs when touched and bloats up its belly to show its anger or irritation. It is rare as we have encountered only one in the entire two years of survey (Plate-4: a, b&c).

4. Glandular Horned Toad- *Xenophrys glandulosa* (Fei, Ye & Huang, 1991)

The species *Xenophrys glandulosa* was first described by Fei, Ye and Huang in 1991 and was recorded to have found in China. Much later it was also recorded from Nagaland in India. It is recorded for the first time in Tura Peak Reserve Forest of West Garo Hills District of Meghalaya after 22 years of its discovery. It was first sighted from Boldaka.ding (Co-ordinates: N25°30'56.5'' & E090°13'19.2'') on 24-10-12 at 13.20 hrs and later from the side of Rengsangrap falls (Co-ordinates: N25°30'44.5'' & E 090°14'05.8'') on 28-



Plate-2: b. *Xenophrys boetgerri* (dorsal view)

8-13 at 18.45 hrs at an altitude of 437m above SL. It was measured 9.5 cm SVL. It was photographed and after observing the characters it was identified. The head is broader than long. The snout is broadly pointed. Nostril is much nearer to the eyes than the snout. The tympanum is small and horizontally oval in shape. The supratympanic glandular fold is distinct which ends in the shoulder. The eyes are large, prominent and jutting out above head. The pupil is rhomboidal and bluish black. The iris is glossy deep brown. The upper lip is cream coloured in adults but slightly whitish in juveniles. The loreal region is concave and black in juveniles but it is chocolate brown in adults. A triangular pattern is present in between the orbit followed by indistinct 'V' shaped glandular ridge and another incomplete inverted 'V' on the posterior portion of the dorsum. The dorsum is light brown in adults but deep brown in juveniles. The forelimbs have dark brown spots in a line. The fingers are free without web and are not dilated. The thigh and tarsus have rows of dark brown spots. It has longitudinal bands. Toes one fourth are webbed. The ventral side of the head, throat and belly are off white mottled with chocolate colour. Its habit is it bloats its belly when touched. There are 3-4 yellow spots on lateral sides of body. We have encountered five numbers from heavily forested area around the peak and most of them were found near the stream and waterfalls. We also have observed one cricket enjoying its meal by eating something from its skin. We have encountered 9 numbers during our search but left them in their own natural habitat (Plate-5:a&b).

5. Mountain Cascade Frog *Amolops monticola* (Anderson, 1871):

Amolops monticola (Anderson, 1871) has been newly recorded for the first time from Tura Peak Reserve Forest of West Garo Hills District of Meghalaya after 136 years of its discovery. It is found in India in the states of Nagaland and West Bengal. It is also found in China, Nepal and Tibet. It was first recorded from Rongkhon stream (co-ordinates: N25°31'34.9'' & E90°14'29.5'') at an



Plate-3: a. *Xenophrys major* (side view). Diplok Miksim(Garo)



Plate-3: b. *Xenophrys major* (dorsal view)



Plate-4: a. Zunheboto's Horned Toad *Xenophrys zunhebotoensis* Diplok Mikchak (Garo)



Plate-4: b. *Xenophrys zunhebotoensis* (front view).



Plate-4: c. *Xenophrys zunhebotoensis* (ventral view).



Plate-5: a. *Xenophrys glandulosa* as observed in its natural habitat;Diplok Nokma(Garo)

altitude 2475 ft. It was sighted sitting on wet rock beside the fresh flowing water on 24-7-13 at 21.45 hrs. It was caught with a net fitted to a pole and its measurement was taken 10 cm SVL. It has stout body. The Head is triangular and has large eyes with oval shaped pupil. The tympanum is small compared to the eyes. There is small skin fold from the upper jaw extending below the eye to the shoulder. The dorsal part of the body is bluish black with small pimple like warts. Two light orange mixed with bluish black dorso-lateral series of glandules are present extending from eyes to groin. Bluish green patterns are seen all along the sides of the body on bluish black background. Limbs are strong which have cream yellow bands. Fingers are free with large discs. Toes have large discs and fully webbed. Another adult frog was found but body was bluish black. It is very active at night and seen resting on the wet rocks. When approached, at once it jumps onto the other wet rocks or stones and disappear in the bushes. The fingers are free with well-developed large discs. The toes are fully webbed. Many local people capture these Cascade frogs for consumption. When interviewed, one boy admitted they capture about 60-90 frogs in a day just to prepare one dish. We have encountered 23. It is common (Plate-6: a).

6. Pied warty Tree Frog *Theلودerma asperum* (Boulenger, 1886):

The species was first described by Boulenger in 1886 and its distribution has been recorded in Arunachal Pradesh, Assam and Nagaland in India but *Theلودerma asperum* has not been reported from any part of Meghalaya till this day. After 127 years, it was first sighted from wet rock while it was foraging on it during the day time on 27-9-13 at 11.05 hrs. It was discovered from a Rongkhon stream (co-ordinates: N25°31'34.9'' & E90°14'29.5'') at an altitude of 2494 ft. It was photographed and its measurement was taken 2 cm SVL. Its morphological characters were observed and identified as Pied Warty Frog. The fore-limb measured 1.5 cm and the hind-limb measured 3 cm. The head is rounded and the nostril is located close to the snout which is blunt. The upper jaw is white. The eyes are large and prominent; the pupils are round and black and the iris is red. The tympanum is depressed and slightly smaller than the eyes. The head and trunk are white or greyish white or brownish white with two triangular designs; one small triangular deep blackish brown patch is located in between the eyes and the other big triangular design is located on the dorsal and hinder region of the body which is whitish brown with deep blackish brown patches on all the three corners. It has small brown patch on the snout. The dorsal surface is scattered with vein-like branch or un-branch lines which may be brown or bluish. It also has light blue irregular patches on the body. The fore-limbs are short and deep grey in color with blackish brown bars. The first finger is shorter than the second finger. The fingers are free and all digits are with discs. Toes are slightly dilated and about half are webbed. The fingers and toes are very sticky and slippery. The under- side of fingers and toes are grey. The thighs have mixed colours of white, grey, brown and black bars. The under-side of the head is blackish brown and the abdomen has brown patch which extends on the thorax and on either side of the stomach. In the centre of the thorax, abdomen and under-side of the hands and thighs, there are large and small brown spots. We have encountered seven numbers only. It is very rare and small frog (Plate-7).



Plate-6: a. *Amolops monticola* Gandrak Rongbrin (Garo)

7. East Asian Tree Frog *Polypedates leucomystax* (Gravenhorst, 1929) Gandrak Wa.ro (Garo)

It has been found in Meghalaya but the exact place from where it has been collected and observed is not mentioned (ZSI, 2010). Hence, it could be the first record from Tura Peak Reserve Forest of West Garo Hills District. It was first sighted on 13-8-12 at 10.44 AM resting on the bamboo leaf in Upper Chitoktak stream (N25°31'39''1 & E90°13'75''3 at 365 ft. It was sighted just after heavy rainfall. It was caught alive and brought at home to identify and photographed. It measures 8.5cm SVL. Species identity was confirmed by observing the four dark brown longitudinal lines on the dorsal i.e two longitudinal lines extends just behind the snout or above the nostrils and the other two longitudinal lines are observed extending from eyelids to the groin. Head is large. The eardrum is large and equal to the diameter of the eye. When at rest a distinct 'W' mark on the hind neck is observed. Limbs are long with large discs on all the digits. Toes are extensively webbed and there is little webbing between the fingers. We have encountered 17 numbers of this species but there can be many more since it can easily hide among the dead leaves it is very difficult to count (Plate-8:a).

8. Common Tree Frog *Polypedates maculates* (Gray, 1838), Gandrak Kobok (Garo)

Its distribution in Meghalaya has been mentioned but the location from where it has been collected and observed was not mentioned (ZSI, 2010). Therefore, it could be the first record from Tura Peak Reserve Forest of West Garo Hills District. It was first sighted from a thatch house residing in the foothills of Tura peak at Babupara (N 25°30'50''5 & E 90°10'72''2) at 722 ft on 23-2-13 at 11.43 AM. It was measured 8.5cm SVL. Its species is identified by observing its characters. The skin is pale white while at rest, during the month of December and February, when the climate is very cold. Another polypedates maculates was found on moist sandy ground few centimeters away from dead leaves on 17-4-13 when the climate is hot. The body colour is sandy brown with a distinct chocolate brown-black band along the sides of the head and through the eyes. The pupil is large and horizontally placed. The loreal region is concave. It has two black spots on either side of the flank. The dorsum bears a series of small spots and stripes on the back. The eardrum is distinct and almost as big as the eyes. The nostrils are closer to the tip of the snout. The upper jaw projects beyond the lower jaw. The forelimbs are short and slender. Both the fingers and toes have large discs. The first and second fingers are almost equal in length. The toes are half webbed and there are traces of webbing on the fingers. The sub-articular tubercles are well distinct. The legs are cross barred and the rear sides of the thighs are yellow with dark brown spots. The



Plate-7: a. *Theلودerma asperum* side view.

b. *Theلودerma asperum* front view.



Plate-7 c. *Theلودerma asperum* dorsal view

d. *Theلودerma asperum* ventral view

ventral side is white which have numerous small wart like projections which made the skin appear rough. We have encountered 17 numbers of the same species. It is common (Plate-9: a & b).

9. Green-Backed stream Frog *Odorrana chloronata* (Gunther, 1876) Gandrak Janggiltangsek (Garó)

Its distribution in Meghalaya has been mentioned but the exact location of its occurrence has not been written (ZSI,2010). Therefore, it could be the first record in Tura Peak Reserve Forest of West Garó Hills District. It was first sighted on 21-4-12 at 2.31PM, on moist rock, near the flowing stream surrounded with green grasses and shrubs at Rongkhon Chibisik(N 25°30'32.4'' & E 090°13'53.5'') about 1.5 km away from Tura Peak. Its species identity is confirmed by observing its characters. The head is as long as broad. The nostril is closer to tip of snout. The snout is moderately rounded. The loreal region is concave. Tympanum is large and round almost the size of the eye. The

eyeball is circular and its rim is glossy yellow. The dorsal skin is green with few dark spots. There is a black stripe extending from snout to groin on either side. Jaws are white. Dorsolateral glandular fold from behind eye to groin is prominent. The fore limbs are slender, fingers are free and digits slightly dilated. The hind limbs are long and slender, with small black patterns. The rear side of the thigh is yellow with black rounded patterns. The limbs have cross bands with dark brown shade. Toes are padded and fully webbed except the 4th toe. The ventral side is white. Its length is 4.5cm SVL. We have encountered 25 numbers (Plate-10: a).

10. Marbled Frog *Amolops marmoratus* (Blyth, 1855) Gandrak Sambeng (Garó)

It has been found in Meghalaya but from where it has collected was not mentioned (ZSI, 2010). Hence, it could be the first record from Tura Peak Reserve Forest of West Garó Hills District. It was

first sighted from the side of the stream at Upper Babupara (N 25° 30'62.4'' E 90° 13'78.3'') at

Meena Awe Sangma



Plate-8:a. East Asian Tree Frog *Polypedates leucomystax* Gandrak Waro (garo)



Plate-9:a. *Polypedates maculates* Photograph taken on cold winter 4-2-13, Gandrak Kobok (garo)



Plate-9:b. *Polypedates maculates* photograph taken in hot summer 17-4-13, Gandrak Kobok (garo)

512m altitude on 16-5-13 at 8.33 PM. It was photographed from the spot where it was found. Its species identity was confirmed by observing its characters. Head is broader than long. The snout is projecting beyond mouth. The nostril is nearer to the tip of the snout. The tympanum is not very distinct. The dorsum is brown variegated with light yellowish brown or spotted with darker beneath yellowish brown. The skin is finely granulated which are larger on the sides of the body even the belly is granular. There are elongated tubercles which are arranged all along the sides appearing just like a shell. The forelimbs are short with light brown cross bars. The fingers are free with enlarge discs with marginal groove. The hind- limbs are long with tibio-tarsal articulation reaching beyond the tip of snout. The toes are entirely webbed and the tips have enlarged discs with marginal groove. The inner and the outer metatarsal tubercles are

indistinct. We have encountered 13 numbers of the same species (Plate-11: a).

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Plate-10:a. Green-back stream frog *Odorrana chloronata* Bengblok Janggil-tangsek(garo).

11. Leaf Frog *Rana erythraea* (Schlegel, 1837), Bengblok Okbok (Garo):

It had been found in Meghalaya but the exact location of its habitation was not mentioned (ZSI, 2010). Probably, it would be the first record from Tura Peak Reserve Forest of West Garo Hills District. It was sighted from the grass beside the bushes from Upper Babupara (N25° 31'25.5'' & E90° 13'27.3'') at an altitude of 1455 ft. It was photographed 1-8-13 at 1.06 PM and after observing its characters it is identified. Head is longer than broad. Snout is slightly pointed. The loreal region is concave and the nostril is nearer to tip of snout. The eyes are large and tympanum is nearly the diameter of the eye. The forelimbs are slender, fingers are long, free and the tips of fingers dilated into small discs with circum marginal groove. The hindlimbs are long and tibio-tarsal articulation reach the tip of snout. Toes are are long and the tips are dilated into small discs. The inner meta-tarsal tubercles are small and oval shaped. The dorsum is brown or glossy brown. From the tip of the snout through the eye along the side of the dorso-lateral glandular fold there is black longitudinal band. The upper lip is white. The hindlimbs are speckled with brown. The ventral side is smooth and immaculate white

12. Rohtung Frog *Occidozyga borealis* (Annandale, 1912), Bengbrek Chonte (Garo):

Its distribution has been mentioned in Meghalaya but the exact location of its habitation was not written (ZSI, 2010). Therefore, it could be the first record from Tura peak reserve Forest of West Garo Hills District. It is found in Arunachal Pradesh and Nagaland. It was found from under the stone beside the stream on 22-10-13 at 4.25 PM from Akimbri (N 25°31'10.9'' & E 090°13'31.9''). It was photographed and its SVL measured 2.5cm. It is a small frog with its head broader than long. Nostril is laterally located which is equidistant from eyes and tip of snout. The pupil is circular and there is a prominent white spot below the eye on upper jaw. Inter orbital bar is prominent. Tympanum is

indistinct. Supra tympanic fold is prominent. The forelimbs are moderate and fingers have rudiment of web in between them. The tips of fingers are rounded into small discs. The dorsum is smooth and light or dark brown with small patches of grey scattered. Flanks are darker powdered black all over. The hindlimbs are moderate and tibio-tarsal articulation reaching the eye. Toes are fully webbed and distal phalange of 4th toe is free. Both the palm and the sole are fleshy. Ventrally abdomen is plain whitish but the throat and chest is speckled with grey. The thigh and lower parts are dark grey. We have encountered 13 numbers.



Plate-11:a. *Amolops marmoratus* Gandrak Sambeng(Garo)

14. Terai Warty Frog *Fejervarya teraiensis* Dobois, 1984 Bengblok Chiring(Garo)

It has been found in Meghalaya but the location from where it has been found was not written (ZSI, 2010). Probably, this could be the first record from Tura Peak Reserve Forest of West Garo Hills District. It was first sighted on 24-4-12 at 9.07 AM from Top-Chitoktak (Coordinates: N25° 30'44.9'' & E90°13'90.3'') at an altitude of 1252 ft and subsequently found from Upper Chandmari and Upper Babupara. It was photographed and its characters are closely observed. It is medium sized frog. The skin is rough and warty almost in all dorsal part. It varies in colour from yellowish-brown, in some yellowish-brown with orange-blotches and greenish-black. The main distinguishing characters on the back; it has symmetrical longitudinal folds, blotches and warts of various sizes. It has inverted "U" shaped wart on the back which is very prominent. The head is broad or as broad as its length. There is a black band in between the eyes which has two small warts. The eyelids also have small warts. The pupils are rhomboidal. The snout is oval or obtusely rounded and slightly projecting. The nostrils are dorso-laterally placed which are prominent. Tympanum is distinct and 2/3rd the diameter of the eye. The supra-tympanic ridge is well distinct which extends up to the shoulder. Tips of fingers are blunt, round, not enlarged without dermal fringe. Sub-articular tubercles are well developed and palm cushioned. The hind limbs are short and tibio-tarsal articulation reach the

shoulder. They are mainly found in small streams where water flow is slow and shallow.



Plate-14:a. Terai Warty Frog *Fejervarya teraiensis*.

15. *Polypedates assamensis* (Mathew & Sen, 2009) Gandrak assamni (Garo)

Its distribution has been recorded in Assam by Mathew and Sen in 2009. It was first recorded on 22-4-14 at 4.32 PM from Upper Chandmari (coordinates: N25° 30'79.8'' & E90° 13'41.7'') at an altitude of 1337 ft. It was photographed and its characters were closely observed and allowed to remain in its own natural habitat. Head is as long as broad. Nostril located closer to the tip of the snout and slightly below the dorso-lateral ridge. Loreal region is concave. Snout is protruding beyond the lower jaw. Tympanum is depressed and 2/3rd the diameter on the eye. The inter-orbital width is broader than inter-narial width. Forelimbs are moderate, fingers are long and free. First finger is shorter than second finger. The tips of fingers are well developed with discs. Hind limbs are long and tibio-tarsal articulation reached up to the snout. The toes 2/3rd are webbed and inner metatarsal tubercle are prominent. Dorsum is brown and smooth strewn with irregular black spots. Skin on the head is not ossified. Limbs are banded. The ventral side is creamy-pink with small irregular dark spots on thorax and abdomen. The thighs on the ventral side are reddish-pink. It has small dorso-lateral glandular fold which is non-continuous towards the abdomen. They are found on the tree-stumps under shady areas in dense forest

DISCUSSION

Each species has its own unique characters and its way of living is different. Tura Peak though small in area has many different species of amphibians but gradually they are declining due to deforestation, soil erosion and the streams are drying up due to scarcity of water as well as due to small construction of dams upstream for private water connections and public water supply. During rainy season many of the amphibians are washed

away due to heavy showers of rain water. Frequently landslides take place where the trees are



Plate-15: a&b. a) *Polypedates assamensis* side view and b) *Polypedates assamensis* ventral view

uprooted and huge boulders roll over them killing the innocent creatures. The amphibians are gradually decreasing in number not only due to natural calamities but due to illegal felling of trees and also due to omnivorous habit of some local people. Immediate attention has to be taken by the Forest Department to stop deforestation which directly hampers the forest resources and growth of many living creatures. Wildlife department should impose all the rules and regulation drafted in Wildlife Protection Act, not to allow illegal hunting of amphibians in order to keep the nature ecologically balanced.

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