Diversity and Distribution of Herpetofauna

and Evaluation of their Conservation Status in the Barail Hill Range (including the Barail Wildlife Sanctuary) Assam, Northeast India.

Final Report

February 2008

Abhijit Das

Division of Herpetology, Aaranyak,

50 Samanwoy Paths, Survey, Beltola, Guwahati-781028, Assam, India

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ABBREVIATIONS AND ACRONYMS

AVC: Arya Vidyapeeth College

asl: Above sea-level

BNHS: Bombay Natural History Society

CITES: The Convention on International Trade in Endangered Species of Wild Fauna and Flora

CAS: California Academy of Science

CAMP: Conservatuion Action Management Plan

DBH: Diameter at breast height

DHA: Division of Herpetology Aaranyak

GAA: Global Amphibian Assessment

WLPA: Indian Wildlife Protection Act 1972

IUCN: The World Conservation Union

NP: National Park

RF: Reserved Forest

NER: North East Region

WLS: Wildlife Sanctuary

ZSIC: Zoological Survey of India Calcutta

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BACKGROUND TO THE BARAIL HERPETOFAUNA PROJECT:

Barail hill rangein Northeast India runs in a Southwest-Northeast direction from Jaintia hill of Meghalaya through Assam up to Southern Nagaland forming a dispersal route for fauna form the higher ranges of Manipur-Nagaland to east and northeast. With the habitats ranging from Tropical evergreen to Tropical Semi-Evergreen forests at lower elevations up to Sub-Tropical Broadleaf hill forest at upper reaches, this highest hill range of Assam state still largly remained unexplored biologically.

To fill in the gap in knowlwdge, the Project "Diversity and Distribution of Herpetofauna and evaluation of their Conservation Status in Barail Hill Range, Assam, Northeast India" was initiated in the year 2007 and is developed and implemented by the Division of Herpetology, *Aaranyak*. The project received funding from Rufford foundation, UK under its small grant program and is supported by Forest Department, Assam.

The Primary aim of the project is to add hitherto unknown information's on reptiles and Amphibians of the hill range to increase the conservation value of the newly declared Barail Wildlife Sanctuary and also to initiate conservation awareness among fringe village areas. Besides acting as conservation reference for BWS the project will likely to contribute in filling up the gap in herpetological knowledge of Northeast India. The key output of this project will be to develop a comprehensive Herpetofaunal database that can act as a resource for management and generation of widespread awareness among various section of society. However, much more information yet to be generated from this entire hill chain that ranges ranging from Meghalaya through Assam up to Nagaland of Northeast.

EXECUTIVE SUMMERY:

This report provides an assessment of the "Herpetofaunal diversity and distribution" at the low to mid-elevation areas of Barail Hill range, Assam Northeast India. The survey was undertaken as part of the ongoing Herpetological Research and Conservation Program under division of Herpetology of *Aaranyak*.

The present investigation was conducted in an around newly declared "Barail Wildlife Sanctuary" that falls in between Cachar and North-Cachar hills district of the state of Assam. Various localities in and around the sanctuary like Maruacherra, Naraincherra, Abongpunjee, Bihara, Barkhola, Dolu and Bijoypur Tea estate, Bandarkhal and Jatinga were surveyed between March 2007 to September 2007.

Visual encounter search and Oppurtunistic search were made along hilly forest trail (Nirmatha hill, Bandarkhal Hill, Maruahill, Abong Hill) and along forest streams (Lakhicherra, Duiganga, Chamduba, Tellacherra, Bhaluknala) at elevations ranging from 22m to 1100 m asl. Habitats surveyed include tropical evergreen forest, secondary forest, mixed forest of bamboo and scrub, plantation forest, roadside vegetations, agricultural land and fringe village areas. Information of species occurrence also referred to pictures taken from previous surveys and from interviews of members of local community.

A total of 64 species of Herpetofauna comprising of 43 Species of Reptiles and 23 species of Amphibians were recorded. Among Reptiles, 24 species are Snakes, 17 species are Lizards; and 3 species are Turtles. During field survey, we came across new range records for two forest Skink species, one frog species. We encountered a set of cryptic species and species whose specific status yet to be determined. We also documented the natural history information for all the species encountered during fieldwork.

The present survey recorded two schedules- I, four Schedule- II species listed under Indian wildlife Protection Act 1972. Out of the 3 recorded species of Turtles, two species are listed as Endengered in Red Data Book of IUCN. A total of 7 recored species comes under CITES appendices.

1.0 INTRODUCTION

The North-eastern India along with Himalayan region is a unique transitional zone amongst the Indian, the Indo-Malayan and the Indo-Chinese biogeographical zones as well as being the meeting point of the Himalayan region with the Peninsular India (Takhtajan, 1988). This region is constituted by seven north-eastern states and is popularly known as 'seven sisters.' The total forest cover of this region is 164,043 sq km, which is 25% of the total forest cover of India (FSI, 1997).

NE is a site spanning across sites spanning the Himalaya and Indo-Burma global biodiversity hotspots (cf. Mittermeier *et al*., 2004), North-east India forms a significant portion of both the Himalaya and Indo-Burma biodiversity hotspots (Mittermeier *et al*., 2004). The region can be broadly differentiated into the Eastern Himalaya (Olson & Dinerstein, 2002) to the north, the North-east Hills (Meghalaya and Mizoram- Manipur-Kachin forest zones of Olson & Dinerstein, 2002) to the south, and the Brahmaputra River basin (BRB) (the Brahmaputra valley forest zone of Olson & Dinerstein, 2002) in between (also see Mani, 1974). Of these, Eastern Himalaya and North-east Hills are primarily montane zones with contrasting geological origin and morphology, while the BRB consists of the flood plains of the Brahmaputra River (Mani, 1974). North-east India has a relatively complex biogeography due to a combination of factors, including its age, unique plate tectonic and palaeoclimatic history, location at the confluence of distinct realms (Afrotropic, Palearctic, and Indo-Malay; cf. Olson & Dinerstein, 2002), wide physiognomic range (e.g. altitude ranging from *c.* 100 to > 7000 m above sea level) and habitat diversity (from tropical to alpine; Champion & Seth, 1968; Puri *et al*., 1989). Distribution data across multiple plant and animal groups indicate that the region's biological affinities are closest to South-East Asia (Mani, 1974).

However, the forests of northeast India are under tremendous pressure of exploitation. Studies have indicated that within a period of two years between 1995 to 1997, about 1,875 sq km of forest land were converted to crop land for shifting cultivation, whereas the natural regeneration was recorded over only 1,700 sq km of land (FSI, 1997) resulting in a net loss of 175 sq km of forest over a two-years period.

The state of Assam bordered on north by Bhutan and Arunachal Pradesh, on east Arunachal Pradesh, Nagaland and Manipur, on south Mizoram, and on east by Tripura, Bangladesh, Meghalaya and West Bengal. Thus represents a unique physiographic makeup characterized by hills, platue and flood plains. The hills are extensions of Himalayan mountain range and geological of recent (tertiary) formation. The Karbi Platue a part of Karbi-Meghalaya complex is composed of oldest rocks of Precambrian origin. The plains namely Brahmaputra and Barak are formed as a result of deposition of alluvial sediments on the tertiary and Mesozoic bed rocks and the depressions are developed due to tectonic disturbances.

Barail hill range (24º 58´- 25° 50' N & 92° 50' - 92° 52' N) is a southwestern extension of patkai range and runs south-westerly from southern Nagaland and parts of Northern Manipur up to Jaintia hill of Meghalaya. The range also forms watershed between two largest river systems of Northeast- the Brahmaputra and Barak and form well known valley of Jatinga. The range forms important catchments of Barak River, which is the second largest river of Northeast India. Barail range also forms catchments of Jatinga River, Doloo River and the Harang River. The vegetations of the hill range vary from subtyropical broadleaved hill forest at higher reaches (Dzaphü peak in Southern Nagaland) to semi evergreen and evergreen elements at lower reaches (Assam). Thus the site covers two Biomes: Biome 8 (Sino-Himalayan subtropical Forests) at 1000- 2000 m and Biome 9 (Indo-Chinese Tropical Moist evergreen Forest) mainly below 1000m.

Newly declared Barail wildlife Sanctuary covering an area of 326 sq km mainly covers the northern low to mid elevation hills of Cachar district of Southern Assam. These low to mid elevation hill ranges are continuous with the more lofty mountains part of North cachar reserved forest nd adjoining Barail ranges falling in North Cachar hill district. The river Jatinga flows all the way though the western boundary of the BWS and merge with Barak river at a place called Jatingamukh below Barkhola village. Another river Dolu runs through the eastern boundary of the BWS. The Silchar-Halflong railway line and the Silchar-Halflong PWD road also pass all along the western boundary of BWS. Both the Railway and the road is undergoing major development project with the

conversion of meter gauge Silchar –Halflong railway line to Broadgauge line and conversion of Silchar-Halflong road to six-lane highways. The Silchar-Halflong road touches few villages namely Barkhola, Balacherra, Maruacherra, Damcherra, Bandarkhal, Dittockcherra all are located at the western fringe of Barail wildlife Sanctuary. The southern boundary of BWS is marked by fringe villages like Naraincherra, Balacherra, Puticherra, Maruacherra, Abongpunjee, subongpunjee. Majority of these fringe villages are dependent on panjhum cultivation (Khasi settelers) besides other vegetables and fruits (mainly Pineapple, Banana and Oranges) on the adjoining hill slopes besides. The whole BWS area is drained by a matrix of small rocky streams which flow through small ravines and valleys, and join the Jatinga River on the western boundary of the reserve. The south-western corner of BWS is drained by network of Lakhicherra stream that meet Jatinga River near Balacherra. Another major stream of the western side of BWS is the Tibong Nullah. Similarly the major south-eastern part of the sanctuary is drained by network of Subang Cherra and Abong Nullah that meet Doloo River below eastern corner of BWS. Except the main stream, other small network of streams remains dry from winter up to pre-monsoon (March-April) period. However during rainy period the major streams of BWS becomes uncrossable. During that period, extensive riparian vegetation develops all along stream sides. Large patches of wild banana occur in openings of moist forest, and along waterways. The primary vegetation is tropical semi-evergreen to moist evergreen forest corresponding to Cachar Tropical Evergreen Forest 1B/C3 and Cachar Tropical Semi-evergreen Forest 2B/C2 (Champion and Seth, 1968).

2.0 REVIEW OF LITERATURES

The History of herpetological exploration in Northeast India began as early as 1784 with the establishment of the Asiatic society in Calcutta. Mr. Edward Blyth (1810-1873) was made the first curator of the Society and with that zoological specimen from all corners of British Empire began to arrive at the society. Thomas Jerdon (1811-1872) was posted in Northeast and Peninsular India and he contributed many herpetological specimens to the Society. The most important work of Jerdon includes a series of two papers that deal with his expedition findings from Khasi Hills and other Himalayan Region. This led to discovery of *Calotes jerdoni* an agamid from Khasi hills and is named after him with many other new species. At about the same time Albert Günther of the British Museum (Natural History) published a monograph in the year 1864, intended to cover the Herpetofauna of British India. The work of Günther was followed by George Albert Boulenger, including volumes on anuran amphibians (1882a), Salamanders and Caecilians (1882b), Lizards (1885a, b, 1887a), Turtles and Crocodilians (1889a) and Snakes (1893, 1894a, 1896b). In that monograph a large representation of species from Northeast India and neighboring region like Indo-China and Indo- Malaya was included.

(Annandale 1904a, b; 1905a, b, c, d, e; 1906, 1907, 1908, 1909, 1912a, b,; 1915, 1917, 1919) and described numerous new taxa particularly amphibian taxa from Northeast India and Burma. Alcock (1904) described *Gegeneophis fulleri* from Silchar, only caecilian from Assam. This is presently represented by the holotype only. From the early part of nineteenth century Frank Wall of the Indian Medical Service contributed in the field of herpetology with his prolific writing particularly on snakes and produces a monograph on snakes in the year 1921. Wall contributed in compiling a detailed list of Serpentofauna of Khasi hills and Snakes of Upper Assam. However, the most comprehensive monograph on Herpetofauna of India including Ceylon and Burma is that of M. A. Smith (1931, 1935, and 1943). Smith's volume on Lizards and Snakes still remain as most comprehensive taxonomic account of those fauna of the region as a whole. Few works are put forward by the scientists at Zoological Survey of India like Acharji and Kriplani (1950), Talukder and Sanyal, (1978) Mathew (1983, 1995). Murthy (1985) tried to list all the valied species of reptiles. Chanda (1994) enlisted 24 species of anuran amphibians from Assam in his treaties of anurans of NE India. Dr. Indraneil Das (1995) conducted Turtle survey in Northeast India and came up with important distributional information about little known turtle fauna of the region. Dr. Anwaruddin Choudhury also reported several important locality records for turtle fauna of Northeast India (1990, 1993, 1995, and 1996). Dr. Saibal Sengupta and his team studied the Herpetofauna of various protected areas of Assam namely Garbhanga RF (2001), Turtle fauna of Kamrup District (1997), Dihing Patkai sanctuary (2003). They came up with many new distributional records particularly that of amphibians (See Sengupta et al, 2000). They also described the first species of Assamese Day gecko *Cnemaspis assamensis* from Assam (See Das and Sengupta 2000). S. Pawar and A. Birand (2001) conducted a rapid survey at few tropical areas of Northeast India that leads to the rediscovery of few Herpetofaunal taxa and a wolf snake taxa new to science from Northeast India and Myanmar. Captain and Bhatt (2000, 2001) studied the snake fauna of Eastern Arunachal Pradesh, David *et al*, (2001) instrumental in delineating many taxonomic challenges in the Snake fauna of Northeast India specially snakes belonging to genus *Trimeresurus*. Slowinski *et al*, (2001) described a new species of Wolf snake from Northeast India and Myanmar. A few works are put forward by individuals like Ao *et*

al (2004) reported the snakes of Nagaland. David and Mathew (2005) reported about the old snake collection at eastern regional station of Zoological Survey of India, Shillong. Pawar (2000-2001) Conducted first extensive exploration of the Herpetofauna of Mizoram State. His work led to the rediscovery of several poorly known texa from Mizoram. Ramanujam and Harit (2002) reported about a college collections of reptilian fauna of Mizoram State.

From the year 1997, the Division of Herpetology at Aaranyak initiated its Herpetological research and conservation Program covering the Northeast India and came up with many significant findings. M. Firoz Ahmed documented three new species of Anuran amphibians from Assam state (See Dutta et al 2000, Das et al 2004; in press) with many new amphibians locality records (see Ahmed and Dutta, 2000; Deuti et al 2000). From the year 2003, the division started its Herpetofaunal inventory in Kaziranga National park, Southern Nagaland and in Arunachal Pradesh. This led to few significant findings on reptiles of the region that were reported (See Ahmed and Das 2006; Das and Ahmed; 2007a; Das and Ahmed 2007b; Das et al 2007; Das and Das, 2007). Besides this patchy works in different parts of northeast India, the southern Assam part and particularly that of Barail Hill range hitherto escaped herpetological exploration and thus remain as a gap in herpetofaunal knowledge of the region. Thus this Barail Herpetofauna project has much to contribute in filling up this gap in understanding of the distribution pattern of Herpetofauna of Northeast India.

3.0 CLIMATE

The climate of the study area is largely tropical tending toward little subtropical at the upper reaches. Precipitation is high, with a brief but predictable rainless period. The early survey period (March-April) of the study area is characterized by dry rainless period whereas during middle and later part of survey (June-September) heavy rainfall observed with rapid increase in water levels in rivers and streams. The annual rainfall varies from 2000mm to more than 6000 mm. The westernmost part of the Barail Hill Range receives the heaviest rainfall in Assam (Choudhury, 1993).

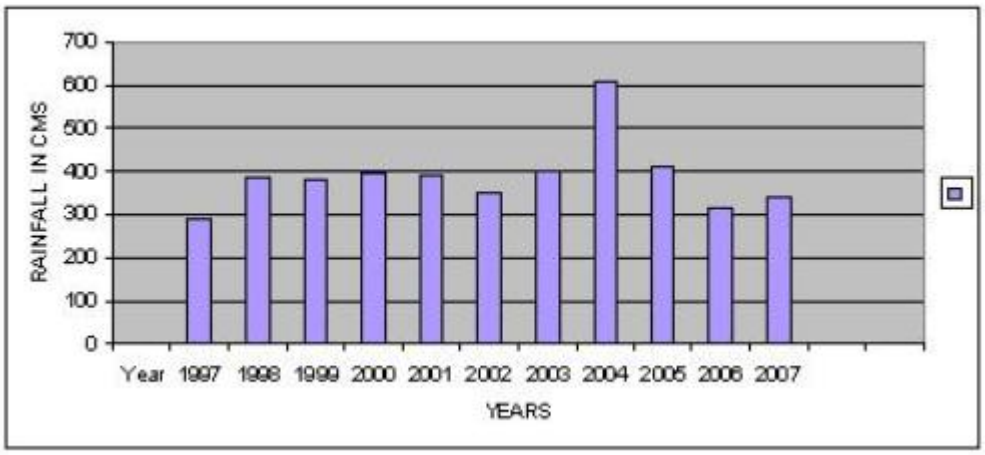

Fig: 1.0 Rainfall data of last ten years derived from Dalu Tea Estate at the Fringe of Barail Wildlife Sanctuary.

4.0 VEGETATION OF THE STUDY AREA:

The vegetation at low to mid elevations areas of the Study area is tropical semi-evergreen to evergreen forest, tending towards more broadleaved subtropical elements at higher reaches. The main secondary landscape elements are cultivated flatland, extensive brakes of monopodial bamboo (*Melocanna sp.*) and clusters of sympodial bamboo (*Dendrocalamus* sp.), tree plantations (teak, gomari), secondary and disturbed forest (e.g. betel vine plantations, Pan Jhum), and village gardens.

The top canopy or upper story consists of tall trees. Some of the commonly occurring species are *Artocarpus chama, Bischofia javanica, Dysoxylum gobora, Lagerstroemia reginae, Pterospermum acerifolium, Duabanga grandiflora, Terminalia bellerica etc.*

The next canopy is represented by small trees and shrubs. Some of these are Bauhinia purpurea, coffea benghalensis, Ficus hirsute, Leea robusta, Micromelum minutum, Rhus succedanea, Solanum torvum, Clerodendron colebrookianum, Oxyspora paniculata,

Phologanthus sp., Sterculia hamiltonii, and Triumfetta rhomboidea. Canes like *Calamus erectus* and C. *leptospadix* occure in swampy areas and form impenetrable thickets. Some of the palms are also met within these forests; the most common are *Caryota urens, Licula peltota. Livistona jenkinsii*, whereas *Cyathea-* the ferns and large leaved fern like *Angiopteris evecta* with fronds measuring upto 6 m in length may also seen along the streams and moist places. Species of wild *Musa* are also the prominent features of these forests.

The forest is densely covered with numerous climbers and epiphytes. Of the numerous lianas, species of *Acacia, Bauhinia, Derris, Entada, Gnetum, Hodgsonia, Mucuna, Piper, Raphidophora. Thunbergia, Vitis* are more prominent. Several species of *Calamus* also stretch long distances from one tree to another. Some of the common climbers are *Ipomoea sp*., *Trichosanthes cordata, Tetrastigma bracteolatum,* T*hunbergia coccinea, piper sp., Dischidia rafflesiana* etc.
Some of the common epiphytic orchids are species of *Aerides, Coelogyne, Cymbidium, Dendrobium, Pholidota, Rhynchostylis* etc. and epiphytic species of ferns belongs to *Asplenium, Drymoglossum* are also common to these study areas.

The ground flora mainly consists of herbaceous elements such as *Begonia roxburghii, B. sikkimensis, Chirita sp., Commelina sp., Globba sp., Impatiens sp., Derrengia amaranthoides, Floscopa scandens, Oxalis corniculata, Murdannia nudiflora, Polygonum sp., Elatostema sp. etc. Arundina graminifolia,* the bamboo orchid is also seen along the open cut slopes of the hills.

The conspicuous rhizomatous Monocotyledons forming a green belts at low elevations along with Bamboos are *Colocasia sp., Costus sp., Curculigo capitulate, curcuma sp., Hedychium sp., Musa sp., Curcumorpha longifolia , Phrynium rheedei, Zingiber sp*., is occasionally seen along the streams.

5.0. AIMS AND OBJECTIVES:

5.1 Barail Herpetofauna Project Aim:

1. To prepare an initial checklist of the amphibians and reptiles of the low to mid elevation areas of the Barail Wildlife Sanctuary.
2. To annotate the list, when possible, with natural History informations of the species.
3. To delineate the conservation status of the Herpetofauna encountered during the field survey.
4. To initiate conservation awareness among fringe villagers, students and among forest staffs of the study area.

5.2. Survey Objectives

In this rapid Herpetofaunal assessment, we endeavored to document as much of the Amphibian and reptile diversity of the study area as possible. In addition to presence records, we collected as much Natural history information as possible (microhabitat used by species, Reproductive information's, ecological parameters, egg deposition etc.). Furthermore, we recorded geo coordinates and latitudinal distributional pattern of the recorded Herpetofauna which will enable in understanding the distribution pattern of the Herpetofauna of the hill range. We conducted some informal talks and interviews with the local inhabitants of fringe village areas. Through these interviews, we came across local vernacular names of species and also gained an insight into consumptive use of few Herpetofaunal species. The talks and interviews also revealed that a bulk of Herpetofaunal species known to local villagers were yet to be revealed from the present study area. We however, believe that the preliminary result in this report will help to improve our understanding of the biodiversity and other environmental values that lowland tropical evergreen forest supports. This will also allow us to give an initial assessment, evaluating and defining priority areas for biodiversity conservation. Based on these initial results, we can plan for multi-taxa survey effort not only to help draw the boundaries but also to develop an operational plan of the newly declared Barail wildlife sanctuary.

6.0 METHODS

6.1 Study Area Accounts:

1. Doloo Tea Estate: Located 31 KM from Silchar town, DTE is the one of the biggest tea garden at the fringe of Barail hill range. We conducted survey at Subhong Punjee, Abong Punjee, Moynagarh, Lalbagh and Khoril all comes under juridistiction of DTE and situated on the south-eastern fringe of BWS. The Doloo River which forms the eastern boundary of BWS flows through the DTE. This river is one of the major transports to carry forest products from forest to DTE. Although the majorities of the area comes under human habitation and tea plantation but the Abong, Subhong and Khoril villages having secondary forest areas with extensive bamboo dominated hill slopes on fellow jhum lands.

2. Bijoypur Tea Estate: Another tea garden at the fringe area of BWS. The localities surveyed under BTE are chotorampur, Bijoypur Basti, Putichera and Sanyasitilla. All these localities are on small undulating hills rising from adjoining plains of Barkhola village and are covered with degraded vegetations and poorly maintained tea gardens. The forest around the area is characterized by dense growth of Climbers and woody shrubs and Bamboos. The area also contains few slow flowing perennial streams.

3. Maruacherra Punjee: A small khasi hemlet situated ca. 10km from Barkhola Village. The village is situated at the fringe of BWS. The village peoples are dependent on Pan-Jhum cultivation on the surrounding hill slopes. We conducted diurnal, Crepuscular and Nocturnal search along marua stream as well as existing forest trail and pan-Jhum cultivation area.

4. Lakhicherra stream: One of the major streams of Barail wildlife Sanctuary and significant to the drainage system of the study area. Numerous small streams connect to Lakhicherra. It meets Jatinga River near Balacherra. The upper reaches of the steam is rocky with large Bryophyte covered rocks. The network of streams surveyed is Tellacherra, duiganga, Bhaluknala, Chamduba, Borthol. Of these streams the Bhaluknala is a narrow stream with ca. 4-6 ft width and having steep banks. Duiganga is a meeting point of two forest stream and is deep with sandy bottom and bank. Chamduba and Borthol are large fast flowing stream with large moss covered boulders and thick vegetation on either side. Many uprooted large trees can be seen stuck in the stream. We conducted Diurnal and nocturnal surveys were conducted both along forest streams and along forest trails.

5. Lakhicherra Ridge: The western hill slopes of BWS. Initial few north-eastern directed slopes are dominated by secondary bamboo forest (100-400m) and during present survey, extensive Bamboo flowering was recorded in those hill areas. The Highest point of this hill chain that was covered during this survey was Nirmatha Tilla (=hill; altitude: 1000m). Base of few slopes were planted with teak. On the slopes towards forest streams are having patches of wild Banana plants. These hill ranges were approached from Maruacherra village.

6. Gubicherra Stream: This is an undisturbed fast flowing forest stream with large boulders and thick vegetations on both side. Large mossy boulders with thick vegetations which provide hiding place for torrent frogs. The upper side of the stream is having tall forest on side. Th stream alternate among sandy and rocky bottomed, surrounding forest alternated among, banana clumps, bamboo and large buttressed trees. We conducted 4 kilometer diurnal stream transect from lower reaches.

7. Notbeng: Actually "North Bank" of river Jatinga. The area is characterized by large boulders on Jatinga river bed. Most of the forest above slopes is under various degradation states. The area is subjected to extensive boulder collections. The area harbors some of the excellent evergreen forest patches on Panighat area of North Bank. Most of the rocky streams of North bank hill side are seasonal. We conducted diurnal walking survey mostly along logging and stone extraction trails of the area.
From North bank we covered the Adakuchi Basti Nulla. This stream is characterized by rock bottomed with high steep banks, composed of mossy rocks. Thick leaf litter accumulates during dry season on the stream.

8. Naraincherra: It was a tea garden at the fringe of Barail covering its low lying hill slopoes. However the tea garden is non functional now. The area surveyed is Upportilla, Aarikol, Chandrapur, and Zinghacherra. The evergreen forest patches of Panighat on the other side of river Jatinga was reached by Boat and Surveyed. During June when Most of the Low lying area of Narainchera was inundated by the flood water from Jatinga River. We conducted diurnal and Nocturnal boat survey at the forest fringe areas.

9. Bandarkhal: A small settlement at the fringe of BWS and falls on Silchar- Halflong PWD road. The area characterized by large rocky streams and thick streamlines forest. We made stream transect, walk along forest trail and also road transect from Bandarkhal village. Some of the adjoining slopes are under Jhum cultivation; however the interior hills are with having thick forst.

10. Noonchuri: This is one of the entry point of BWS near densely populated Bihara village. Harang Stream that originated from Barail hills makes a waterfall at Nunchuri. From Nunchuri it moves through Bangarpar and meets Barak River near Badarpur-SriGauri. The habitat at Nunchuri is characterized by rocky and flat stream bank with hill forest on both sides. The habitat is disturbed at the low lying areas.

11. Jatinga Village: A well known village for its so called "Misterious death of Birds" (See Choudhury, 2000 for an explanation)**.** This village extends from a ridge to steep slopes (from 700-749m asl) on the northern tip of BWS. The village is located ca. 10 km southeast of Halflong of North Cachar Hill district of Assam. We conducted a short trip to the village during August 2007. We conducted rapid survey along existing forest and Jhum field of nearby hill slopes.

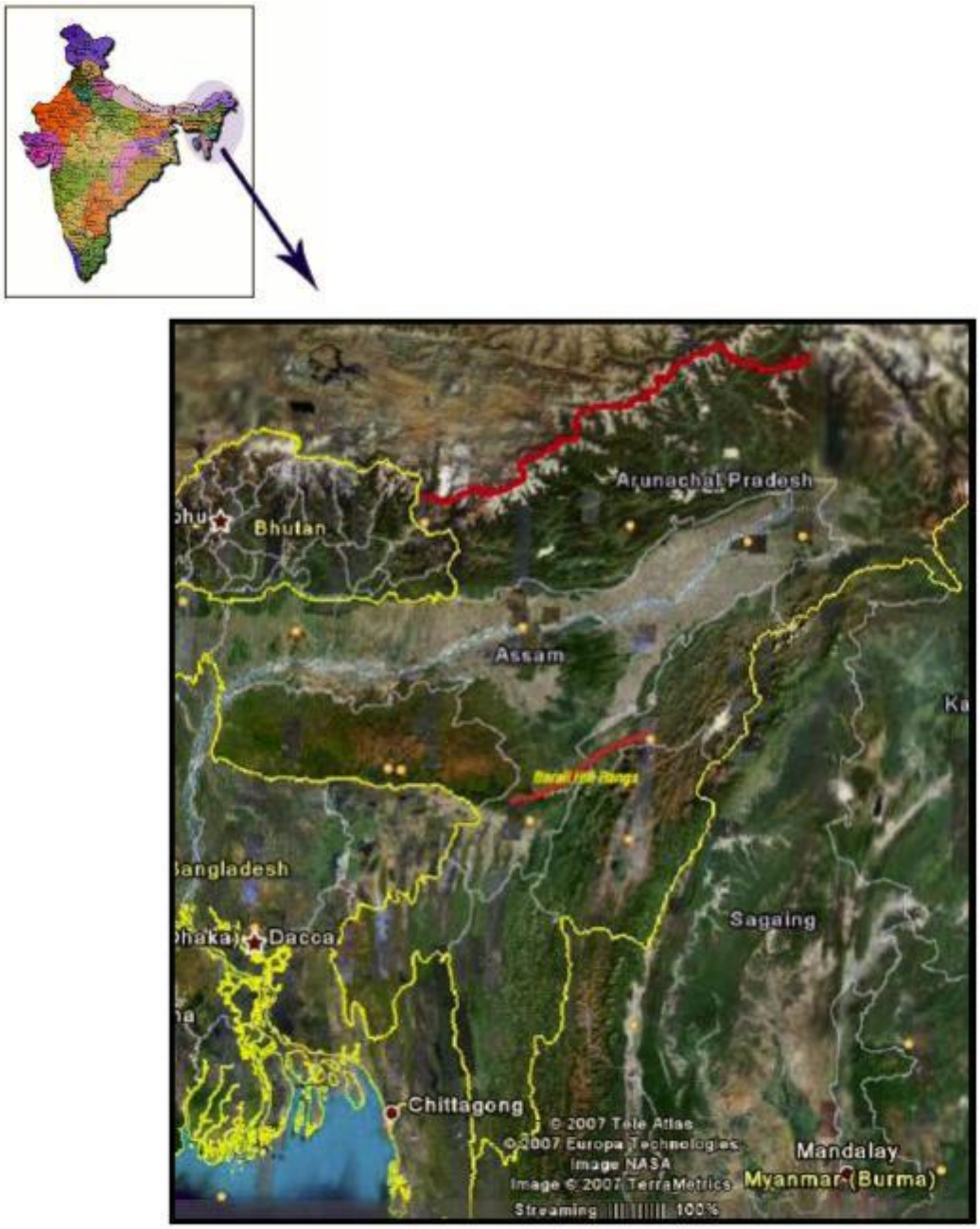

Fig: 2.0 Map of Northeast India showing location of Barail Hill Range

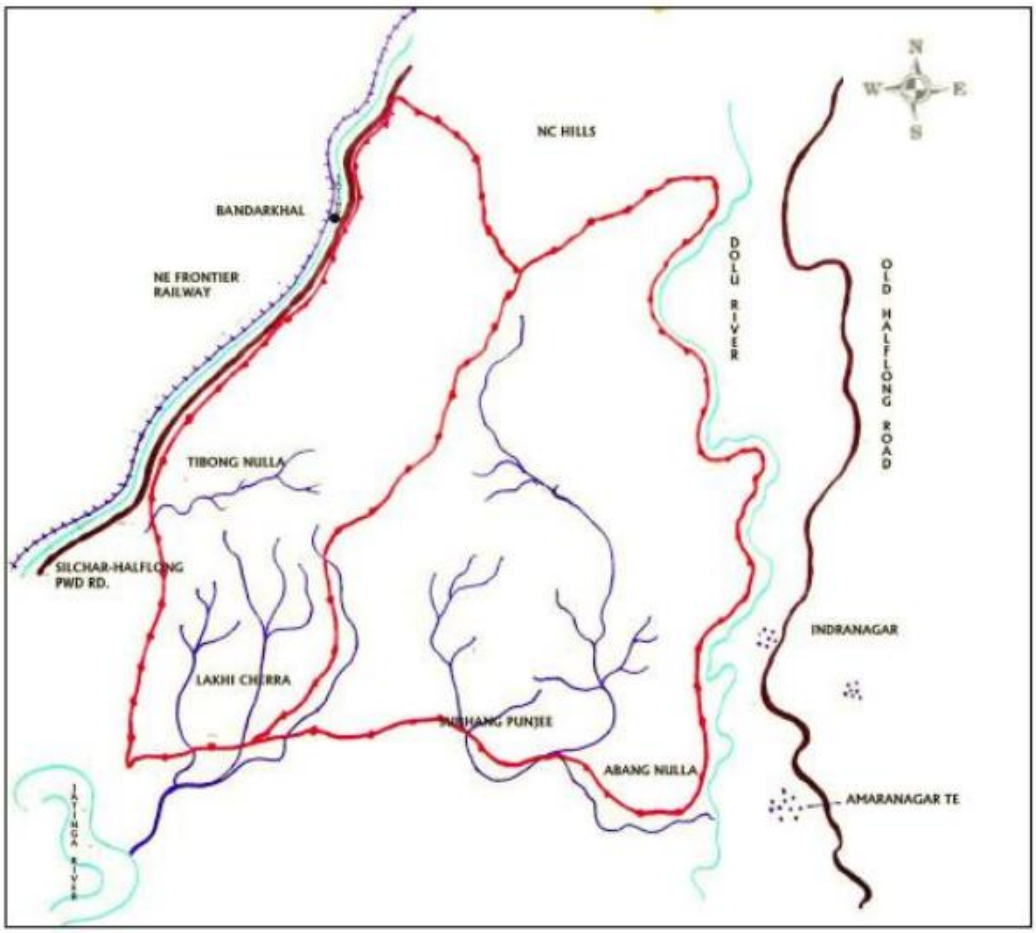

Fig: 3.0 Map showing the Boundary of Barail wildlife Sanctuary with its major Drainage system along which most the present survey work was conducted. Also seen are the south-western boundary of the Park marked by Silchar-Halflong PWD road along Jatinga River and the Railway tract which runs from Silchar to Halflong. The Eastern Boundary is marked by Dolu River.

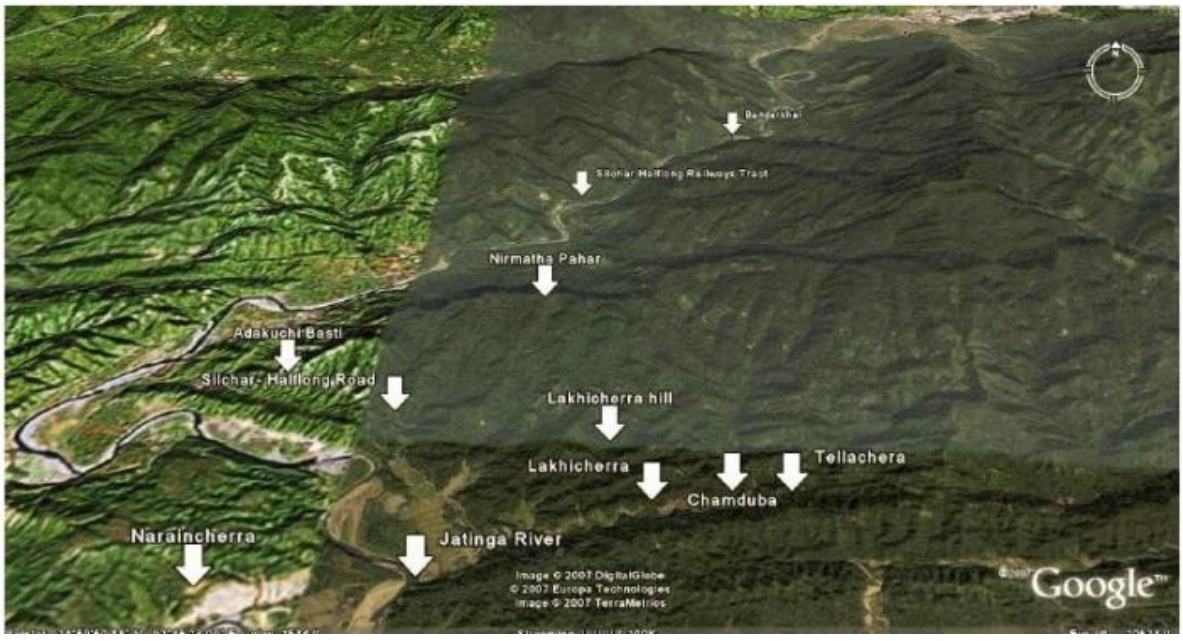

Fig. 4.0 Satellite imagery of Barail Hill range at lower elevation showing survey locations. Jatinga River on the south western side and PWD road – Railway track running along the river and touching the western boundary of BWS.

6.2 Survey Methodology

During March 2007- September 2007, we spend 95 field days to document the Herpetofaunal diversity in and around BWS. During that period we surveyed tropical evergreen forest, secondary forest, mixed forest of bamboo and scrub, plantation forest, roadside vegetations, agricultural land and fringe village areas. Individuals of a particular species were found by visual encounter surveys (Heyer *et al.* 1994; Rödel and Ernst 2004). This method of survey was the most frequently used technique throughout the study. Using this method, we walked within an identified survey site visually searching for amphibian and reptile species. Visual encounter surveys were employed in all terrestrial sites with the effort focused on sampling particular areas which appeared to provide suitable habitat for potentially present species. However, active search involving turning rocks and logs, peeling bark, digging through leaf litter, and excavating burrows and termite mounds also produced good result. For Frogs, we performed acoustic searching along forest trail, forest edges and along forest streams, starting from late evening upto 2000-2200 hrs adied by flashlight. During day time we searched for heliothermic (basking) reptiles along forest trails, forest edges and stream sides besides active search method. Our aquatic searches involved examining each type of aquatic habitat (watercourses, sweeps, ephemeral pools, and permanent pools).

We made incidental observations any time a species was located in an area that was not actively being surveyed. We incorporated records of roadkill individuals, and the individuals caught by fringe village peoples.species species en of a species GPS points were collected at the location of the Observation and some general descriptions of the species and location were made as well.

6.3 Data collection

We collected data for each individuals of a species encountered during field work. The Locality, date, time, weather condition, habitat, Microhabitat, gender of each individual (when possible) and reproductive condition of each individual (if it can be determined), co-existing species if any and behavioural note were recorded in a field data sheet.

We also made taxonomic note of individuals captured during field work and morphometric data like of the individual gathered.

Photographs were taken of representatives of each species and habitats with a Six- megapixels digital camera (Canon S3IS). Geographic coordinates for each survey site were determined in the field with a Garmin GPS 12 receiver. Coordinates were recorded as latitude and longitude in decimal degrees.
Identification of the species was done using the keys in Smith (1931, 1935, and 1943); Schleich & Kästle (2002); Das (1995); Dutta (1997) and David and Vogel (1996).

Common English name of Herpetofaunal species follows Das and Dutta (1998), Das (2002), Whitakar and Captain (2004).

For amphibians, we followed Taxonomy of Frost (2007) and for Reptiles we followed Uetz *et al.* (2004).
Status evaluation for the evaluation of Herpetofaunal species, we referred IUCN Red List (2004), Indian wildlife (Protection) Act 1972, CAMP (1998), GAA (2000), and Appendices of CITES (CITES 2005).
We have interected with residents living at the fringe village areas of BWS with the aid of colored Herpetofauna field guides. Interviews with yielded local names of Herpetofaunal species or group and also supplemented our field observations data. We also came to know about the local consumptive use of few Herpetofauna species in these fringe village areas. Only those interview accounts that were ascertained to be valid (i.e., based on available literature and our personal knowledge of the species) are mentioned in this report.

7.0 FINDINGS

7.1 Species accounts

7.2 Amphians

Dicroglossidae

1. Flat- headed Frog*: Limnonectes laticeps* (Boulenger 1882)

We recorded the species on 1st April 2007 at 0830 hr. Three individuals of the species were found in Puticherra nullah (SVL: 36mm-42mm). The individuals were encountered in a degraded forest under leaf litter of rocky streambed with little water.
Juveniles of the species are brick red in color. When disturbed, always try to retreat under leaf litter.

2. Trickle Frog *Occidozyga sp*

This species is recorded on 29th March at 1100 hr from Notbeng hill. Individuals of the species (SVL: 20mm-27mm) were found under rocks of a moist Evergreen forest streambed. Next time the species was recorded on 29th March 2007 under bryophyte covered rocks of Adakuchi basti nullah. We encountered >10 individuals.

3. Indian Bull Frog *Hoplobatrachus tigerinus* (Daudin 1803)
This species is commonly encountered in and around fringe village areas of BWS. Individuals were encountered in and around ephemeral water pool, open field and around habitation. This species is consumed in fringe village and tea garden areas.

4. Cricket Frog *Fejervarya complex*:
At least three distinct morphotypes (here considered as three separate species) we observed during the field work. ***Fejervarya sp1*** with distinct reddish mid dorsal line occurred sympatrically with the ***Fejervarya sp2*** without mid dorsal line on, distinct inter orbital stripe and blotches on leg. Both these species were encountered in and around human habitation, plantation area, open fields, around epihemeral water pool and degraded forest edges during the study period. Our ***Fejervarya sp3*** is characterized by relatively small size and narrow reddish mid dorsal stripe. Snout more pointed than their sister species and is an inhabitatnt of slow flowing rocky evergreen forest stream.

Borthakur *et.al.* (2007) recognized four species (*F.nepalensis, F. teraiensis, F. pierrei, F. syhadrensis*) from Assam and reports widespread occurrence of the species in Kamrup district of Assam. Ao *et al.* (2003) recorded *F.nepalensis, F. teraiensis* from Nagaland. Thus occurrence of these species can be expected in and around BWS.

5. Indian Skittering Frog *Euphlyctis cyanophlyctis* (Schneider, 1799**)**
This species was recorded from all kinds of waterbodies (Ponds, rivers, Forest streams, temporary water pool, village water holes and wells, and also swampy areas). The individuals from different areas of the survey sites showed variation in dorsal patterns, The Moynagarh and Abang punjee individuals are with large dark blotches on the dorsum (Plate: XI B). However individuals from Jatinga River and other forest streams of BWS are without any dark blotches but with longitudinal rows of large warts on the back.

Ranidae
6. Taipeh frog *Hylarana taipehensis* Van Denburgh 1909

We recorded the species on 2ND May 2007 at 6.30pm from Bihara. Individuals were seen calling from water hyacinth and other emergent aquatic vegetations of perennial lentic waterbodies. Three individuals seen in waterlogged paddy field area. Calling aggregation of the species was also recorded from Narainchera and Barkhola of the study area.
Sengupta et al. (2001), reported the species as abundant in Kamrup district of Assam, however Dey and Gupta (1999) reported the species as rare in Barak Valley of Assam.

7. Stream frog *Amolops* sp.
First individual (SVL 58.12 mm) of the species was caught from Adakuchi Basti Nullah. The individual was under boulders near rocky bottomed stream at 101 m altitudes Was under boulder 3ft away from slow flowing water. When eencovered, it jumped into stream water and taken refuge among leaf litter under water. On 27 May 2007 this species was encountered on big boulders of Borthol stream. Take refuge in fast flowing water but come out on stuck on accumulated plant materials. During day time the individuals of the species were seen hiding among mesic vegetations that grow on the large stream boulders. A preliminary taxonomic analysis keyed out for this species keep it close to the species *Amolops gerbillus*. However, more study with appropriate comparative material is needed to confirm identity.

8. Plain Oriental Stream frog *Nasirana alticola* (Boulenger, 1882)

On 27th May at 1420 hr we found Juveniles of the species (SVL: 28.05mm-31.19mm) on overhanging vegetations above flowing water of Duiganga stream.

On 30th August we recorded the two Male (SVL: 45mm-56.39mm) from Bhaluknala, BWS. Rocky evergreen stream was resting among roots of vegetation above boulders of stream at 10ft above water sitting. Release a pungent smell when caught. Gravid female (SVL: 59.25mm) obtained in August. Others are calling from rocks and vegetation near deep pool of water near streams at 1900 hr.

9. Bhamo Frog *Humerana humeralis* (Bouenger, 1887)

This species is recorded on 2nd April at 1000hrs from near Lakhicherra stream. The Gravid Female (SVL: 82.09mm) was recorded from under thick leaf litter accumulated on the rocky stream bank, ca. 1m above stream water. When disturbed it jumped into water and took refuge among fallen leaves under water.

10. Brown backed oriental stream frog *Silvirana leptoglossa* (Cope, 1868)

This species is frequently encountered along degraded forest edge and also around human habitation. Vocalizations of this species were noted throughout the study period. Individuals were caught from under vegetations in swampy areas and roadside water puddles. One individual was found under rotten log inside secondary forest and others observed from under accumulated logs near human habitation.

Microhylidae

11. Painted Ballon Frog *Kaloula pulchera* Gray, 1831

Calling aggregation of this species is recorded from swampy areas or temporary waterlogged areas in and around human habitations as well as from forest edges during April to June. Calling heard both during day and night hours. In our July-august trip no calling activity was recorded. *Kaloula pulchera* is known from Nagaland (Romer, 1949) and Tinsukia district of upper Assam (Dutta, 1997). Dey and Gupta (2000) recorded this species from Cachar for the first time. Subsequently it was reported from Meghalaya (Hooroo *et al.* 2002) and Mizoram (Sailo *et al.* 2005). Hitherto, no locality of the species is known from north of the river Brahmaputra. Although a borrowing frog, the individuals of the species climbs well and often seen 30cm – 1 meter above surface and individuals were recorded from tree hole at 1-2 m above. One individual was seen at 3meter above while climbing a bryophyte covered tree during heavy shower.

The characteristic yellow mark on side of the back is dark or nearly indistinct in adults whereas it is bright yellow in sub adults and whitish in juveniles.

12. Ornate narrow-mouthed frog *Microhyla ornata* Duméril & Bibron, 1841

Many individuals (N>10) of the species were seen calling from under moist grasses of open areas during May-August. Chorus of the species is commonly heared in and around human habitation as well as forest edges and plantations.

13. Boulenger's Narrow mouthed frog *Microhyla cf. butleri* Boulenger, 1900

Five individual of this species (SVL: 18.50-22.52mm) were caught on 2nd May from Sibtilla of Bihara. The individuals of the species were seen active on ground with fallen bamboo leaves on a sloping area near paddy field at 1930 hrs. When disturbed they jump on leaves of low shrubs at 30-50 cm above. The species is recently recorded for the first time from India from Mizoram state (Saipari Sailo, *Pers com.*) However our Barail record of this species constitutes the first report of the species from Assam.

14. *Microhyla sp:*

Two individuals of this species (!) were recorded in the month April from under brick piles of Maruacherra village. They found in the area where M. ornate also recorded but this variety differs from typical M. ornata in having a relatively stout body, lack of typical dorsal pattern and dorsum with a mid dorsal series of distinct warts. Further taxonomic study is needed to ascertain whether it is a member of *Microhyla ornata* complex (Saibal Sengupta, *Pers. Comm.*) or a distinct species.

Megophryidae

15. Red Eyed Shortleg *Leptobrachium smithii* Matsui, Nabhitabhata & Panha 1998

The individuals of the species were heared calling from following localities:

1. Chandrapur, 2. Maruacherra, 3. Duiganga, 4. Abong Punjee, 5. Damcherra.

The characteristic loud Quak..Quak..Quak….Call typically starts from dusk and continue till 2100 hr. The single individual (SVL: 53.05mm) was found sitting on a rock just near fast flowing Chamduba Stream of BWS at 2300 hr. The individual never attempted to escape when caught. Choudhury et al 2001 recorded metamorphosed frog during February, however during present study metamorphosed froglet of this species was recorded during the month of April.

Rhacophoridae

16. Green Tree Forg *Rhacophorus maximus* Günther, 1858

This species recorded from near "Maruacherra stream" at the outskirt of village during the month of August 2007. The individual was sitting on a tree fern plant at 1.3m above ground.

From Barail range the species is reported from Halflong (Chanda, 1994). Pawar and Birand (2001) confirm the presence of thias species from primary and secondary habitats of Barail RF which is now incorporated into newly declared BWS.

We observed amplecting pair, calling males and gravid females during March-April in Cherrapunjee of Meghalaya, Kamlang and Mehao Wls and Namdapha NP of Arunachal Pradesh and Panbari RF of Kaziranga NP.

17. Twin spotted Tree frog *Rhacophorus bipunctatus* Ahl, 1927

In June 2007, two individual (SVL 34 and 38 mm) were caught from shrubs at 1-2m off the ground near a forest trail in Bandarkhal area of BWS. They were calling. This species was also recorded from Dighorkhal area (on the western end of BWS in one of survey trip by Bhaktiar Hussain (*pers. Comm.*).

18. Bush Frog *Philautus sp*

On 22nd March we recorded this species (SVL: 16-19mm) from Chandrapur area. Many of them were calling from a forest edges and degraded hill slopes. They were seen calling from bushes and small shrubs not more than 2-4ft above ground. Most were seated on leaves.

19. Six lined Tree frog *Polypedates leucomystax* (Gravenhorst, 1829)

Individuals of this species were seen throughout the study period in and around human habitation, plantation, secondary forest habitats, and roadside vegetations and plantation areas. Most of the individuals were seen arboreal situations between heights 30 cm- ca. 2 m above ground.

20. Tree frog *Polypedates sp.*

This species (SVL 57mm) is recorded along the streamline vegetation of Gubicherra stream in the month of August. Roosting individuals were captured from 3-5ft above from overhanging Bushes and streamside shrubs and banana plants. This species carries close similarity with *P.leucomystax* in coloration, size and pattern but differs in not having ossified head.

Bufonidae

21. *Duttaphrynus melanostictus* (Schneider, 1799)

This common species is observed from various habitats ranging from forest edges, plantation, road side areas, tea gardens and human habitations. This species is recorded from all the sites mostly from in and around human habitations and plantation areas.

7.3 Reptiles

SAURIA

Scincidae

1. Many Lined Grass Skink *Eutropis multifasciata* (Kuhl, 1820)

On 28th March 2007 at 1000 hr we encountered the first individual of the species in Marua Basti near Marua Nullah. The speciesis subsequently recorded from Abong Punjee, Doloo TE, Digorkhal, Narainchera, Bandarkhal and Nunchuri. Most of the sightings of the species are from secondary and degraded forest areas as well as plantations, roadside areas and around habitations. At night (1900-2200hr) individuals were seen roosting on thick bushy plants and also in tree holes ca. 1-2m above ground.

2. Bronze Grass Skink *Eutropis macularia* (Blyth, 1853)
The species was recorded from leaflitter of dry stream bed of Chotorampur at 1430 hr inside secondary forest habitat. On 14th June 2007, we recorded gravid female of the species from Naraincherra village bamboo clumps. 2nd April 2007 one female (SVL: 47mm; TL: 66.05mm) was caught from Lakhicherra hill at 1445hr. Activity of this species also recorded during night hours (1800- 2000hrs) particularly near forest trails.

3. Four –keeled Grass Skink *Eutropis quadricarinata* Boulenger, 1887

On 16th June 2007 at about 2100 hrs, one gravid female (SVL: 50.70mm; TL: 102.85mm) of this Skink was seen roosting on a dry branch just above water surface (70cm above) in a waterlogged area at the edge of secondary forest. The area where it was seen having extensive cane brakes and bamboo brakes with isolated trees. The place where it was recorded is Naraincherra (24^0 58.041' N; 92^0 44.554') at 58m altitude and falls at the fringe area of Barail Wildlife Sanctuary. On 20th (after four days) the skink laid three eggs measuring 10.57-10.79 in length and 6.31-6.51 in diameter.

4. Spotted litter Skink *Sphenomorphus maculatus* (Blyth, 1853)

We recorded the species on 28th March 2007 at 1030 hr from Notbeng from the bank of rocky evergreen forest stream. Individual was in breeding color. *S. maculatum* was also recorded on 1st April 2007 at 3pm in Chotorampur near a degraded forest stream.

Another individual in breeding color was caught from on 2nd April 2007 from Lakhicherra Nullah at 0830 hrs. It was foraging near stream among overhanging vegetation and nearby fallen branches. We confer the species with *S.maculatus*; however the dorsal coloration of the later differs from typical *S. maculatus* and also the tail of the later is comperatively longer then typical *S. maculatus*.

5. North-eastern Water Skink *Tropidophorus assamensis* Annandale, 1912.
First individual of this rare skink (SVL: 67mm; TL: 68mm, tail tip missing) is first encountered in Adakuchi Basti Stream at 1215 hr evergreen forest stream under bryophyte covered rocks of a dried stream sloppy area. One Juvenile individual (SVL: 41.23mm and TL: 57mm) was also found under rock from the same area.

On 2nd April 2007, at 1022 hr one female of the species was caught from under large bryophyte covered rocks of a slow flowing forest stream near Chamduba of BWS.

This species was rediscovered from Nengpui WLS of Mizoram after a gap of 90 years (Pawar and Birand, 2001). Mathew (2006) reports about a single individual that was collected from a bamboo thicket near a stream of the species from Lunglei district of Mizoram state. However the Barail record of *T. assamensis* forms the first record of the species from Assam state. The relative abundance of the species suggests that the BWS supports a key population of this little known forest stream dwelling skink of northeast India. Unlike any other Skink species *T. assamensis* remain motionless when uncovered. Movement is sudden and slithering up to a small distance on ground. Found another juvenile in the same habitat under rock.

6. *Eutropis sp* 1
We sighted the individual during two field visit at the same place from Duiganga area of Barail wildlife Sanctuary. The individual was foraging among lianas and branches of an overhanging tree besides water pool of Duiganga stream. It was seen active among top frond of vegetation at 1-4m above, often comes down up to base of lianas and steep stream banks but again rapidly climbing up the vegetations. The size of this unidentified skink can be compared with *Mabuya multifasciata* however it lacks any markings on the side of body (in *M. multifasciata* white spots on the flank region often present) and dorsally plain colored.

Lacertidae
7. Khasi hills long tailed lizard *Takydromus khasiensis* Boulenger, 1917

A gravid female individual (SVL: 40mm) of the species was caught on 2nd April. The Individual was actively foraging among leaf litter at 1230 hr near Lakhicherra stream ca. 1.75m away from flowing water. Two old collection of this species is from Cachar district (Reg. No. ZSIC 12045-46) were collected from Cachar districts housed in ZSIC. Das (2002) reports the distribution of this lecertid as Meghalaya, Mizoram and Assam state as

well as Bangladesh and northern Myanmar In our previous surveys at Cherrapunjee we encountered this species at 1330hrs among grassy patches near stream.

Agamidae

8. Gray's Forest Lizard *Calotes emma* Gray, 1845

Our first encounter with the species is on 28th March at 1430hrs (SVL: 66mm; TL: 170mm) from near Tellacherra nullah, of Barail Wildlife Sanctuary. The male individual was encountered on flat rocky streambed at aquatic edge. It tried to escape by jumping into water.

Another male individual was encountered on 1st September at 1100 hr. from Gubicherra pahar (altitude 200m) on a >45^0 slope. It was basking on a small banana plant at 1m above from Ground. On 17 April, 2007, one Gravid Female (SVL: 91mm; TL: 235mm) of the species was recorded from Herhse (23^0 58' N; 92^0 41'E; 310m asl), Kolasib district of Mizoram.

9. Indian Garden Lizard *Calotes versicolor* (Daudin, 1802)

Commonest Agamid species of the study area and mostly associated with human modified habitats. This species is recorded from all the study sites. Individuals were sighted from the following habitats: Tea gardens, Teak plantation, fence rows of human habitation, Roadside vegetation, near ponds, forest-habitation and forest-agriculture field edges. Most of the sightings were in arboreal situations up to 3 m above ground. Gravid female of this species was caught in the month of September.

10. Forest Agamid *Calotes sp?*

On 4th September 2007, single juvenile individual of the species was found near Tellacherra stream at 2030hrs. It was roosting inside a bush at 1.30 meter above soil surface ca at 3 meter away from Tellachera stream. The dorsal coloration of this unidentified agamid is yellowish with blackish spots. Under excitement, a mid dorsal series of black diamond shaped spots can be seen. At present sample size restrict us in making any further comments on the species. Further, record of the species and subsequent comparison with recently described species of *Calotes* (Viz. C. *irwadi and C. hutwni)* from Myanmar can help in identity of this interesting forest Agamid species.

11. Jerdon's Forest Lizard *Calotes jerdoni* Günther "1870" 1871

Single female individual (SVL: 13 cm, TL: 29 Cm) of the species is recorded on September at 1140 hrs. The individual was caught from shrubs (70cm off the ground) at the edge of Jhum field on a slope near Jatinga village. *C. jerdoni* is a common montane agamid species of Northeast India. In our previous field surveys in southern Nagaland (Kohima) and Northern Manipur (Ukhrul) districts, *C. jerdoni* was commonly encountered around habitation, roadside shrubbery, agricultural lands and along forest trail between altitudes 1500-2350 meter. In Nagaland Both Green and Brown color morph of the species were seen, the two Ukhrul individuals were green with two distinct longitudinal brown lines on dorsum, however Barail individual was uniform green in color. Black color morph of the species is also known. (Ulrich Manthey, *Pers. Comm*.).

12. Flat Backed Japalura *Japalura planidorsata* Jerdon, 1870

We came across five individuals of the species (SVL: 33mm-42.80mm; TL: 62mm-75mm). At on 1230 hrs two male and one female were encountered among leaf litter of fast flowing Lakhicherra stream. At 1320 hr of the same day one female was found on a rocky dry stream bed. The males (SVL: 33mm- 38mm; TL: 62mm-73mm) were seen in breeding color with distinct yellowish-cream stripe on two sides of the head that runs from snout to shoulder. The whole gular of males were reddish. The individuals when disturbed take refuge under big bryophyte covered rocks near the streams by typical hopping locomotion. While handling, the first male individual played dead.

Gekkonidae

13. Tokay Gecko *Gekko gecko* (Linnaeus, 1758)

On 29th March 2007, at 0930 hrs we heard call of this species in Notbeng hill slope besides Jatinga River. Subsequently, we sighted a colony of 6 individuals of the species on 1st April 2007 at 1330 hr. in Bijoypur on a dead ficus tree at 5m above at forest –tea garden edge.

On 2nd April 2007 day time vocalization of the species recorded from hills near Lakhicherra nullah. On 24th May we came across two juveniles in Naraincherra on Ficus tree ca. 2 meter above ground. Zug et al (1998) observed that *G. gecko*, presumably males, call irregularly throughout the day and night from February into June.

14. Flat Tailed Gecko *Cosymbotus platyurus* (Schneider, 1792)

On 28th March we recorded the species at 10am near Marua Basti at the fringe area of Barail wildlife Sanctuary. The individual was seen on the tree bark at 4 ft above and is basking. The surrounding area is having Secondary forest with extensive bamboo growth.

In Nilachal hills near Guwahati city, these geckos are often recorded from large rocks- Ficus tree associated areas during day time (Das, 2002). This Typical microhabitat for this species is also mentioned by Schleich and Këstle (2002).

15. Khasi hills Bent-toed Gecko *Cyrtodactylus khasiensis* (Jerdon, 1870)

A single individual of the species was encountered on 24th may at 1900hrs in Chandrapur area of Naraincherra. The individual was seen on the side of forest trail 20-30 cm off ground among roots.

16. Asian House Gecko *Hemidactylus frenatus* (Dumeril &Bibron, 1836)

This species was recorded largely from Human habitations and ruined tea garden buildings at various localities of Study area. Microhabitat of the species was recorded on building surfaces near cracks or in rafters' ca at 1- 4 meter above ground. Two individuals were seen in a *Ficus* tree hole 1.75m above ground.

Varanidae

17. Bengal Monitor *Varanus benghalensis* (Daudin, 1802)

One single individual was sighted on 15th April at 1000 hr. The locality is near Bhandarkhal ca. 1 km away from human habitation. It was basking near roadside area (slope $>50^{0)}$ near Silchar-Halflong road. This species is consumed locally, and we have seen photographs of the species on sale in local jatinga village market.

OPHIDIA

Typhlopidae

1. Diard's Blind Snake *Typhlops diardii* Schlegel, 1839

On 16 June we recorded the species at 1830 hr from Chandrapur forest edge. The had individual taken refuge on tree crevice at 25cm above water level of a waterlogged area. The freshly caught individual was dull whitish in coloration. Two day later, it shedded its skin and regain its usual metallic colaration.

Boidae

2. Burmese Rock Python *Python molurus bivittatus* (Linnaeus, 1758)

On 2nd April, we encountered one dead individual of the species on Lakhicherra pahar at 339m elevation. The Python was approx. 4m in total length. Although the exact reason of the death could not be ascertained but the area where the snake was found, was swept by forest fire and the under story of the area has completely devastated by wildfire.

Another rescued male individual of Burmese rock python was recorded in the month of July which is measured (SVL 2.3m, TL: 106 Cm) from Moynagarh at the Fringe of BWS.

Colubridae

3. Buff- Striped Keelback *Amphiesma stolatum* (Linnaeus, 1758)

During this work, the first encounter with the species was on 1st April 2007 in Bijoypur Paddy field at the degraded forest edge. The individual took refuge among soil cracks of field. This snake species was also recorded from Doloo tea estate, Barkhola village, Subhong Punjee, Balachera and Bihara all from in and around human habitation and secondary forest edges. Many seen as road kill mainly near human habitation of Silchar- Halflong road. Threat display consists of erection of one third of body and expanding.

4. Painted Bronzeback Tree Snake: *Dendralaphis pictus* (Gmelin, 1789)
The first juvenile individual of the species was recorded from Chotorampur at 1230 hr. The area where it was seen is at degraded forest and tea garden edge and the individual was foraging among high grasses (*Saccharum sp*) 1.2-2m above ground. One individual was encountered while it was crossing forest trail near a jhum field in Abong Punjee.

Another gravid female (SVL: 705mm; TL: 355mm) was recorded from a bamboo clump near human habitation of Naraincherra during the month of April.

On 17th June a male individual in molting condition was recorded from Chandrapur area. It was found among high grass of a waterlogged area. When caught, they expose the sky blue interstitial scales but did not bite.

5. Red Necked Keelback: *Rhabdophis subminiatus* (Schlegel, 1837):
One male (SVL: 427mm; TL: 160mm) individual of the species was recorded from tea garden-forest edge of Naraincherra.

6. Forest Keelback *Rhabdophis sp.*

First individual of this Natricine was encountered on 28th March 2007 at 1100hr. near Lakhicherra Nullah of Barail wildlife sanctuary. The male (SVL: 495mm; TL: 145mm) individual was seen near water puddle among accumulated plant materials. On 2nd April 2007 at 1630 hr, the second female individual (SVL: 465mm; TL: 123mm) was encountered in Human habitation of Maruabasti at the forest fringe area. While handling, it regurgitated One *Silvirana leptoglossa* juvenile. The third male (SVL 610, TL 195mm) individual was caught on 26th May 2007 at 0930 hr. from accumulated vegetation near water puddle 10ft away from fast flowing water of Lakhicherra stream.

Our fourth and the largest male (SVL 600mm, TL 230mm) of the species is from Lakhicherra Jhum field on a hill slope above Lakhicherra stream. The individual was active at dusk. All the individuals' snakes of this species are remarkably docile and never attempted to bite while handling. The largest male indivividual broke its tail while handling, a phenomenon reported in *Xenochrophis* and personally observed in *Rhabdophis subminiatus, Amphiesma stolatum* and also in *Xenochrophis sp.*

7. Mock Viper*: Psamodynastes pulverulentus* (Boie in: Boie, 1827)

On 28th March at 1230 hr. we recorded one juvenile (SVL: 160mm; TL: 45mm) from Borthol shegun plantation area of Barail Wildlife Sanctuary. The individual was seen active among dry leaf litter. On 5th June at 10 am, another female (SVL: 402mm; TL: 95mm) of the individual was recorded from Chandrapur area at the fringe area of BWS. It was found among the fallen leaves on the steep stream bank. David and Vogel (1996) reported that the species is found from sea level up to 2000m inhibiting lowland tropical wet and dry forests, tropical and subtropical wet montane forests, bamboo forests, moist scrublands, marshes and swamps, rice paddies, hedges and gardens in the suburban areas.
8. Green Cat Snake; *Boiga cynea (Duméril, Bibron & Duméril, 1854)*

We recorded the species on 30th august at 0930 hr. in from Lakhicherra stream of BWS. The male individual (SVL: 1205mm; TL: 375mm) was roosting among overhanging leaves of a streamside tree ca. at 1.8m above flowing water. While catching, snake tried to climb up the tree with rapid movement. The snake was found in pre molting condition with distinct eye cap.

9. Green Bronze-back Tree Snake: *Dendrelaphis cyanochloris* Wall, 1921

A female individual (SVL 890 mm; TL: 360mm) was recorded on 30th August at 1430hrs from Bhaluknala of BWS. The snake was encountered at 1-2m above ground among woody shrubs of stream side hill slope. Feeling our presence it climbed nearby branches and took refuge at 6m above. Aggressively bite when caught with remarkable display of whitish interstitial scales.

10. Tawny Cat Snake *Boiga ochracea* (Günther, 1868)
Single female Individual was found inside a dry bamboo at 3ft above ground in Putichera area. The biotope where the snake was recorded is covered with degraded forest on a low hill with extensive bamboo clumps.

11. Common Wolf Snake *Lycodon aulicus* (Linnaeus, 1758)
Single individual (SVL 53cm, TL: 13Cm) of this widely distributed species is recorded from Abong punjee (=Village). The individual was seen inside a thatched house at 2000hrs.

12. Indo-Chinese Rat Snake *Ptyas korros* (Schlegel, 1837):
One individual of this species was seen while roosting inside thick grassy bushes near Tellacherra nullah at 1900 hrs at 40 m asl. David and Vogel (1996) reports, this species is known from sea level upto 1500m. However, in Northeast India, we recorded the species from an altitude of 2000m from Khonoma village of Nagaland state (See, Das and Ahmed, 2007) where it sympatrically occurred with *Ptyas nigromarginatus*.

13. Indian Rat Snake *Ptyas mucosa* (Linnaeus, 1758):
This species was encountered in Dolou Tea estate, Abong Punjee, Narainchera, Nunchuri. This species was always encountered in and around human habitation of nearby Barkhola, Bihara, and Bijoypur villages.

14. White Barred Kukri snake *Oligodon albocinctus* (Cantor, 1839)
During June, one Juvenile was encountered on the base of tree at 40cm above ground. It was active among the roots of that tree at 0820 hr. The area is moderately sloppy, well wooded with extensive growth of *Calamus sp* and bamboo brake.

15. Copper headed Trinket Snake *Coelognathus radiatus* (Boie, 1827):
A single female individual of the species was caught from a ficus tree ca. at 1-2m above at 1715 hrs. Threat display of this species is remarkable with formation of 2-3 loops, mouth wide open, vibrate tail and lung forward. Our Barail individual played dead while handling. According to local peoples, this species is commonly encountered in paddy field during harvesting seasons.

16. Assam Snail Eater *Pareas monticolum* (Cantor, 1839):
A single roadkilled individual was recorded between on Silchar-Halflong road near Bandarkhal village during August. The road segment was marked by a swampy area on one side and forested hill roadside slope. The live photograph incorporated in this report is from Mizoram. The male individual was roosting among the leaf of *Forrestia sp* grown along forest streams. The other known localities of the species from Assam are from Kaziranga NP (Mathew, 1983) and Podumoni Wls of Tinsukia, Upper Assam (*Our record*). Upper Assam individual and Mizoram-Barail individuals showed variation in dorsal pattern. This variation in this species is also noted by Athreya (2006).

17. Yellow-speckled Wolf Snake *Lycodon jara* (Shaw, 1802)

On 16th June 2007 a Female individual (SVL: 320mm; TL: 74mm) was recorded from Narainchera forest edge. It was crossing a waterlogged area. While handling, it always try to hide its head under its coil. This snake never attempted to bite while handling.

18. Oriental Vine Snake *Ahetulla prasinus* (Reinwardt in Boie, 1827)

One male (SVL: 730mm; TL: 425mm) was recorded on 20th June at 0930hr from forest and Human habitation edge at Chandrapur area. The beautiful velvety green individual was encountered above 2.5m on a banana clumps while devouring a medium sized *Calotes versicolor*.

19. Checkered keel back water snake *Xenochrophis piscator* (Schneider, 1799):
This species is frequently encountered in water logged paddy field, village ponds tanks and waterbodies with extensive acquatic vegetation around BWS, both during day and night. One individual was encountered on a moist rocky streambed inside degraded forest of Chtorampur. Two individuals were found as roadkill near teagarden-Forest edge.

Viperidae

20. Spot Tailed Pit Viper *Trimeresurus erythrurus* (Cantor, 1839)

We caught the first male individual (SVL: 435mm; TL: 134mm) on 14th June 2007 from Narainchera village. The individual was found among accumulated pumpkin (2m above ground) of an agricultural area near secondary forest.

Another male (SVL: 325; TL: 75mm) was encountered while it was moving on ground on the bank of Jatinga river at 2200 hr.

Largest individual of the species was a female (SVL: 670mm; TL: 100mm) recorded on 4th September at 2200 hrs from Borthol. The individual was seen coiling among leaf of an overhanging tree branch at 4m above flowing stream water.

21. Blotched Pit Viper *Ovophis monticola* (Gunther, 1864)

On 16th October, a single juvenile individual (SVL 200mm; TL 45mm) was found under boulders just below a landslide area of Jatinga village. In Northeast India, we encountered this species particularly between altitude 1000-2000m asl in the state of Meghalaya and Nagaland. We recorded gravid individuals of this species in the month of June-July. This is the commonest ground dwelling pit viper of Northeast India.

Family: Elapidae

21. Black Krait *Bungarus niger* Wall, 1908

On 25th August, we encountered one male individual (SVL: 832mm; TL: 135mm) of the species near Damcherra village at the fringe of BWS. The individual was found while crossing the Silchar Halflong road at around 7 pm. This species is reported from Cachar district by (Grosselet *et al.,* 2004). This species however widely recorded from northeast India. Nameri, Guwahati, Numuligarh, Margerita, [our record] Dibrugarh, Sadiya, Sibasagar, Garo hills (Smith, 1943), Nameri- Pakui NP (Pawar and Birand, 2001).

22. Banded Krait *Bungarus fasciatus* (Schneider, 1801)

A single individual (SVL: was encountered near human habitation of Maruacherra basti at 1930 hrs. According to local peoples they often encounter this species at night hours especially after heavy showers.

23. Monocled Cobra *Naja kaouthia* (Lesson, 1831)

The brown variety of this species was caught from Abong Punjee during the survey period. The individual had taken refuge under accumulated firewood near habitation at degraded forest edge. Prior to this survey Monocled Cobra is recorded from human habitation of Dolu Tea estate and paddy field of Barkhola village.

24. King Cobra *Ophiophagus hannah* (Cantor, 1836)

On August one male individual of the species was killed in Nunchuri when it entered inside human habitation during day time. Prior to this survey, a King cobra was rescued by members of Desobandhu club members from human habitation of Bihara village located at the fringe of BWS (photographic evidence). We saw a skin of the species from Maruacherra village which was reported to be killed by villagers in the year 2005 from adjoining Pan Jhum field when it attacked their hunter dog during day time. According to local khasi peoples the tail of King Cobra has medicinal use.

TURTLES

Testudinidae

1. Asian Brown Tortoise *Manouria emys* (Schlegel and Müller, 1844)

One live individual (SCL 30cm) was seen in a village house of Bandarkhal. The individual was reported to be caught on "Bandarkhal hill" from a bamboo thicket area during February 2007. Villagers narrated that they hunt tortoises with the help of their trained hunter "Dogs".

In northeast India this species is recorded from Loomajooting in Nagaland, Tarapung area, Kalyani RF of Karbi Anglong, Northern Nagaland, Near Maibong, Langting-Mupa RF and Barail Range, Innerline reserved forest, Damchera area of Innerline RF, Nongkhyllem WLs, Balpakram NP of Southern Garo hills of Meghalaya, Dampa Tiger Reserve of Mizoram (Anderson, 1871, 1872, Das, 1995; Choudhury, 1996, Pawar and Choudhury, 2000).

Bataguridae

2. Keeled Box Turtle *Pyxidea mouhotii* (Gray, 1862)

On 31st May 2007; we examined one shell of the freshly eaten individual from Bandarkhal Village. The owner of the shell narrated that he collected the individual in November 2006 from near a rocky forest stream of Nimatha hill. Nirmatha hill is one of the highest peak of BWS and its altitude is 1100 m. Subsequently, we examined

another shell of the species from Chotorampur village of Bijoypur TE which they found near logging trail of Maruacherra hill during winter season. The Keeled Box Turtle is a terrestrial species that seldom enters water (Ernst and Barbour, 1989). This species is reported from Cachar hills and Kopali river of North Cachar hills by Anderson as early as 1871. The species is reported from Garo and Khasi hills of Meghalaya (Das, 1991), Mehao wildlife Sanctuary, Namdapha National park and Durpong RF of Papum Pare district of Arunachal Pradesh (Das, 1987, Buphathy & Choudhury, 1992; Choudhury, 1995; M. Firoz Ahmed [*pers. Comm.*], Dhansiri RF of Karbi Anglong (Choudhury, 1993). The photograph incorporated in this report is from a live individual of the species from the local market of Udalguri district of Assam. The individual is of unknown origin.

3. Oldham's Leaf Turtle *Cyclemys oldhami* (Gray, 1831)

On 2nd April 2007, the male individual was caught from thick leaf litter of Lakhicherra plateau (ca. 300 m altitudes). The individual measures Straight carapace length: 107mm, Straight carapace width: 90 mm, Curve carapace width: 103 mm, Plastron greatest length: 98 mm. Subsequently, one Shell of the species was examined at Naraincherra village which measured carapace length: 220 mm, Plastron greatest length 190 mm, Shell height: 80 mm. This mesurments closes the highest range reported for the species from Nepal by Schleich & Kästle (2002) and Das (2002).

DISCUSSION

Barail Herpetofauna inventory records 43 Species of Reptiles and 23 Species of Amphibians. Among Reptiles, 5 families 11 genera and 17 species of Lizards; 5 families, 18 genera and 24 species of Snakes and 2 families, 3 genera and 3 species of Turtles were recorded. Among Lizards the family Scincidae is the Dominant family with 6 species followed by family Agamidae (5 species), Gekkonidae (4 species). The saurian Family Lecertidae and Varanidae were represented by single species *Takydromous cf khasiensis* and *Varanus benghalensis* respectively. Similarly the recorded serpentofaunal diversity is dominated by members of the family Colubridae (16 species) followed by Elapidae (4 species) and Viperidae (2 species). The family Typhlopidae and Boidae is represented by *Typhlops diardii* and *Python molurus bivittatus* respectively.

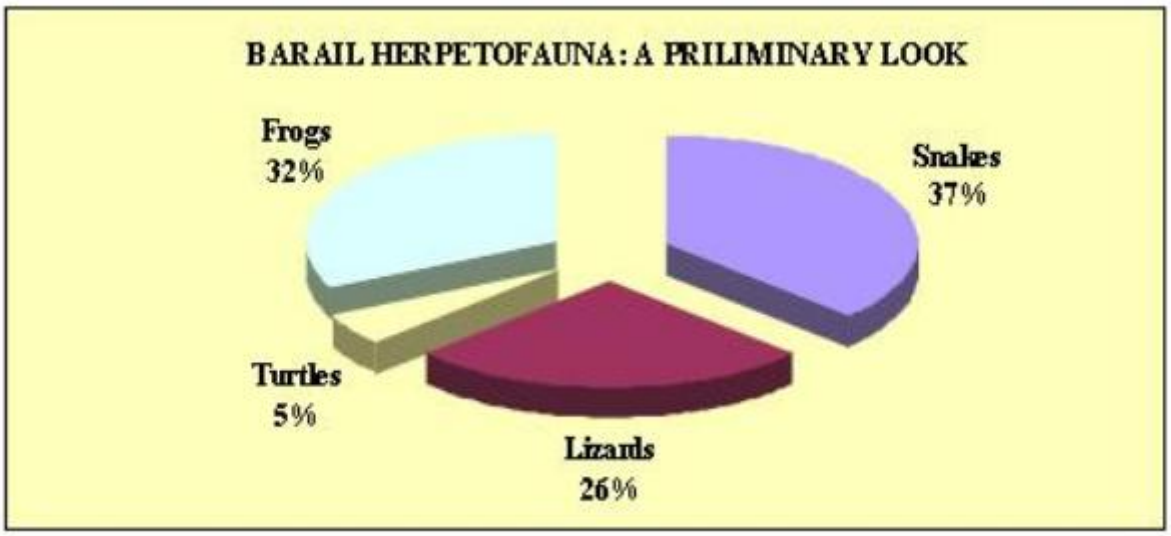

Fig: 5.0 Composition of Herpetofauna recorded during Barail Herpetofauna survey

All the 23 recorded species of Amphibians belongs to a single order "Anura" belonging to 6 families and 17 genus. The family Bufonidae and Megophrydae is represented by single species (*Duttaphrynus melanostictus* and *Leptobrachium smithi* respectively). The Family Dicroglossidae is represented by 7 species, Microhylidae by 4 species, Ranidae by 5 species, and the Rhacophoridae is represented by 5 species.

During field survey, the record of rare and poorly known forest skink species like *T. assamensis* and *E. quadricarinata* are significant as both these lizards are poorly known and rarely been reported since there description. The record of T. assamensis constitutes first report of the species from Assam state. Similarly, *E. quadricarinata* is reported after a gap of hundred years from its type locality "Cachar" and first reproductive information for the species was gathered during this survey (See Das, 2002).

During our survey we came across several species of reptiles and amphibians whose identity is either unknown or provisionally known as of this writing. The positive identification of these will follow with additional survey and collection of more taxonomic data and further collaborative work between DHA, AVC, ZSI, BNHS, and CAS. These provisionally identified species may represent previously undescribed species, or variants of species already included in this list. Among amphibians these poorly identified species include: *Occidozyga sp*, *Amolops sp*, *Philautus sp and Microhyla sp*. Among reptiles they include *Sphenomorphus sp, Rhabdophis sp.*

Several species complexes have also been identified within the Barail Herpetofauna Project. Species Complexes are groups of similar-looking species that in the past have been recognized as only one species like *Polypedates leucomystax* ((Inger, 1999). According to Bain *et al*., 2003, most of the species complexes are widespread, although the member species can have only limited ranges within this broad range.

Among Reptiles, the species complex encountered are *Boiga ochreceus* (Smith, 1943), *Ovophis monticola* (Leviton *et al.* 2003), *Sphenomorphus maculatum*, *Calotes emma* (Ulrich Manthey, *Pers com*.), *Cyrtodactylus khasiensis* (Samrat Pawar *pers com*.), *Ophiophagus hannah* (Das, 2002),

This inventory also reports few species of Reptiles and Amphibians that are recognized as common to much of Southeast Asia. Most of them are adapted to highly disturbed habitat. Among amphibians are *Duttaphrynus melanostictus, Polypepadetes leucomystax, Hoplobatrachus tigerinus, Microhyla ornana, Fejervyra sp.* and among Reptiles are *Calotes versicolor, Eutropis multifasciata, Hemidactylus frenatus.* Few recorded species like *Gekko gecko, Dendralaphis pictus, Ptyas korros,* and *Boiga cynea* have wide ranges in Southeast Asia. (Das, 2002 and Bain &Truong, 2004).
Thus this inventory provide a preliminary view of the Amphibian and Reptilian fauna from the foothills of Barail hill range largely from forested vicinity of Barail wildlife sanctuary. However the result of the inventory contains records that are noteworthy for their biogeographic and taxonomic significance within the context of our present knowledge of the Herpetofauna of northeast India.

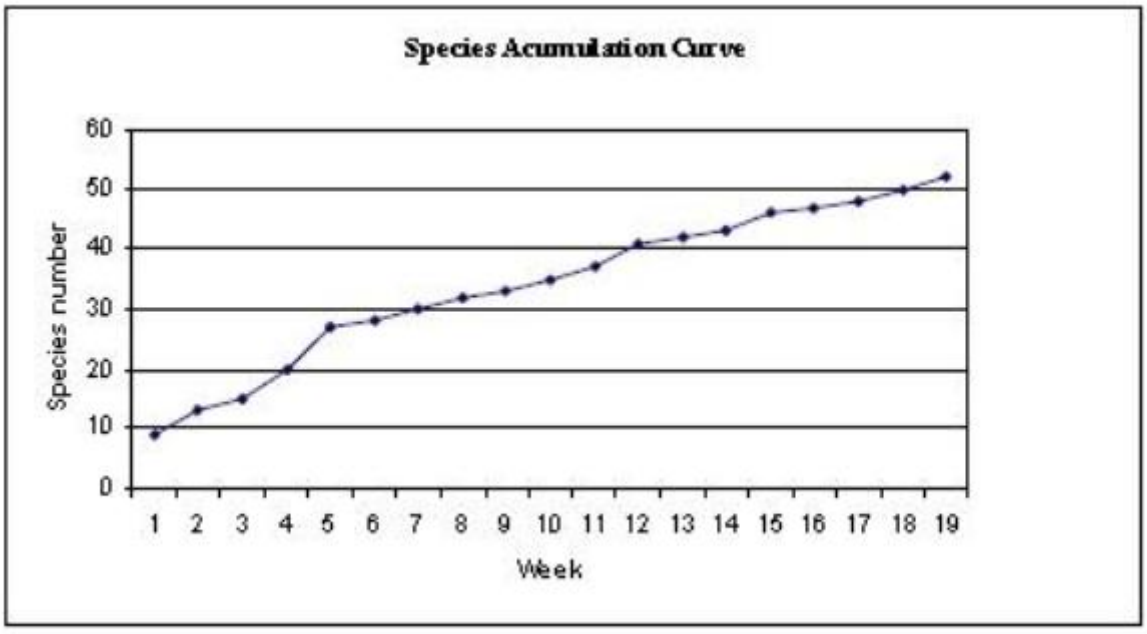

Fig: 6.0. Species accumulation curve of the Barail Herpetofauna Survey.

The reported diversity is low than that of other known inventory in the Northeast India (Pawar and Birand 2001, Sengupta *et al.* 2000; Ahmed *et al.* 2004 Athreya, 2006). We expect numerous forest species to be discovered in the Barail wildlife sanctuary with more extensive fieldwork in these low to mid elevation tropical to subtropical forest areas. This statement is supported by the sharp slope in species accumulation curve drawn for Barail Herpetofauna. This even limit us, to make any remark on the approximation of the species number of the study area. This relatively short survey consisting of a single rainy season could only record a fraction of total diversity of Barail hill range and we believe more survey at different altitudinal grades of this hill range spanning across few more monsoon season will significantly increase the number reptiles and breeding amphibian species.

8 species of Lizards (*S. maculatum, Eutropis quadricarinata, T. assamensis, T. khasiensis, C. emma, J. planidorsata, C. sp and C. khasiensis*), 7 species of Snakes (*P. molurus, D. cyanochloris, O. albocinctus, Rhabdophis sp, B. ochrecea, B. cynea, P. monticola*), 5 species of Frogs (*H. humeralis, N. alticola, Occidozyga sp, Leptobrachium smithii, R. bipunctatus*) were only observed in forested habitats and it is presumed that, loss of forest habtat may be detrimental for those forest species. Similarly, the threat of Herpetofaunal roadkill will likely to increase in near future after the completion of ongoing six lane Highway project that touches entire western part of BWS.

Of this recorded diversity, *Python molurus bivittatus* or Burmese Rock Python and *Varanus benghalensis* or Bengal monitor lizard falls under highest legal protection status of Schedule I species of Indian wildlife protection act, 1972. Four species viz. Monocled Cobra, King Cobra, Indian Rat Snake and Common water snake are listed as Schedule II species and rest all the snake species are listed under Schedule IV of IWLPA 1972. These two species Members of the five genera *Naja* (*Naja kaouthia*, Monocled Cobra), *Ophiopahgus* (*Ophiophagus hannah*, King Cobra), *Ptyas* (*Ptyas mucosa*, Common Rat snake), *Manouria* (*Manouria emys*, Asian Brown Tortoise) and *Pyxidea* (*Pyxidea mouhotii,* Keeled Box Turtle) are listed on CITES Appendix II.

Presence of two IUCN red listed Turtle species (Asian Giant Tortoise and Keeled Box Turtle) categorized as "Endengered" by IUCN also confirmed from the study area. Inspite of such conservation initiatives few species like Bengal Monitor, Turtles and Tortoise were slaughtered in the fringe village areas which is a serious cause of concercern and demands management intervention.

Discussion with the local inhabitants indicated the presence of few interesting "Tree Frog" and the "green backed forest stream dwelling frogs" (cf. *R.chloronata* group) and few more Turtle (Soft shelled Turtle) Lizards (*Varanus sp*).

A detailed Herpetofaunal exploration of the interior lofty mountains falling in Nagaland and North Cachar Hill district of Assam will significantly increase our knowledge regarding species composition and biogergraphy of Herpetofauna of Northeast Indian montane region. "We keep this vision as our next priority".

Table 1.0 Conservation status of the Reptiles and Amphibians Species recorded in the Barail Herpetofauna Project.

Scientific Name	Indian WLPA 1972	CAMP 1998	IUCN Red list	CITES
REPTILES				
Snakes				
Ahetulla prasinus	Schedule IV	EN		
Amphiesma stolatum	Schedule IV	LRnt		
Boiga cynea	Schedule IV	LRnt		
Boiga ochreceus	Schedule IV	DD		
Bungurus fasciatus	Schedule IV	LRnt		
Bungurus niger	Schedule IV	DD		
Coelognathus radiatus	Schedule IV	LRlc		
Dendrelephis pictus	Schedule IV	NE		
Lycodon jara	Schedule IV	DD		
Naja kaouthia	Schedule II	NE		II
Ophiophagus hannah	Schedule II	LRnt		II
Python molurus bivittatus	Schedule I	LRnt		I
Ptyas mucosa	Schedule II	LRnt		II
Ptyas korros	Schedule IV	NE		
Psamodynastes pulverulentus	Schedule IV	VU		
Pareas monticolum	Schedule IV	VU		
Rhabdophis subminiatus	Schedule IV	VU		
Typhlops diardii	Schedule IV	DD		
Trimeresurus erthrurus	Schedule IV	DD		
Xenochrophis piscator	Schedule II	LRlc		III
Lizards				

Calotes jerdonii		DD		
Calotes versicolor				
Calotes emma				
Cytrodactylus khasiensis		VU		
Cosymbotus platyurus		LRlc		
Gekko gecko		DD		
Hemidctylus frenatus		LRlc		
Japalura planidorsata		VU		
Mabuya multifasciata				
Mabuya macularia		LRnt		
Sphenomorphus maculatum		DD		
Varanus benghalensis	Schedule I	VU		I
Thakydromous khasiensis				
Turtles				
Manouria emys	Schedule IV	VU		II
Cyclemis oldhami				
Pyxidea mouhotii		LRnt		II
AMPHIBIANS				
Scientific Name	**Wild Life Protection Act 1972**	**CAMP 1998**	**IUCN Red list**	**CITES**
Duttaphrynus melanostictus		VU	LC	
Hoplobatrachus tigerinus	Schedule IV	VU	LC	
Euphlyctis cyanophlyctis		LRnt	LC	
Limnonectis leticeps			LC	
Leptobrachium smithi			LC	
Kaloula pulchra			LC	
Microhyla ornata		LRlc	LC	
Humerana humeralis			NE	
Hylarana tytleri			NE	
Nasirana alticola		LRnt	LC	
Silvirana leptoglossa		EN		
Rhaophorus maximus		LRnt	LC	
Rhacophorus bipunctatus		LRnt	LC	
Polypedates leucomystax		LRlc	LC	

Abbv. Used: EN: Endengered, VU: Vulnerable, LRnt: Lower Risk Near Threatened, LRlc: Lower Risk least concerned, DD: Data Deficient; NE: Not Evaluated, LC: Least Concerened.

Table: 2.0 Location, elevation and habitat types for herpetological survey sites of Barail Herpetofauna Project.

Site	Coordinates	Elevation	Habitat types
Lakhicherra	24°58.651'N 92°46.754'E	~55m	Rocky stream with streamline vegetation. Extensive growth of Wild Musa clumps along streamline. The lower reaches of the stream having Jhum cultivation on surrounding hills.
Chamduba	24°58.720'N 92°47.183'E	~31m	Fast flowing stream with large Boulders and thick streamline vegetation
Tellacherra	24°58.692'N 92°47.491'E	~85m	Large stream with steep slope on one side and gravel flat land on other side.
Barail Wls Teak Plantation	24°58.720'N 92°47.183'E	~100m	Extensive teak plantation with thick leaf litter.
Adakuchi Basti Nullah	24°59.550'N 92°44.544'E	~173m	Rocky streambed with steep slope on either side, Thick accumulated plant materials on stream bank
Chotorampur	24°57.127'N 92°46.984'E	~36m	Degraded forest with many small streams and water puddles at fringe of Tea garden

Lakhicherra Pahar	24°59.053'N 92°46525'E		Evergreen forest with patches of bamboo clumps.
Nunchuri, Bihara	24°57.351'N 92°39.192'E	~22m	Degraded forest with Bamboo clumps. Large rocky Harang stream. Rock extraction area.
Naraincherra	24°58.041'N 92°44.554'E	~58m	Slow flowing stream with large gravel flat land and riverside grass and thick bushes.
Bhaluknala	24°58.856'N 92°46. 863'E	~40m	Narrow sub stream of Lakhicherra with dense streamline and lithophytic vegetation.
Gubicherra hill	24°59.061'N 92°46.507'E	~200m	Fast flowing stream with large bryophyte covered rocks and extensive growth of lithophytic vegetation.
Borthol	24°58.864'N 92°47.330'E	~45m	Fast flowing stream with large bryophyte covered rocks.
Digorkhal	24°58.030'N 92°34.520' E	~70m	Riperine vegetation. Large boulders on stream. Rock collection trails.
Nirmatha Hill	25°01'17.79'N 92°48'54.03'E	~ 1100m	Well canopied forest on a $>50^0$ slope. Large buttress trees and thick forest floor.

Table: 3.0 Vernacular Names of the Herpetofauna of the encountered during Barail Herpetofaunal Survey.

Genera/Species	Bengali Name (Sylheti)	Khasi Name	Kachari/Dimasa Name
LIZARDS			
Calotes	Roktho Chusa	Rinche	
Gecko	Kok-ke sap	Ko-ke	Garang- gism
Hemidactylus	Tik-Tiki	Vhut	None-maa
Tropidophorus	Satna	Irong	
Mabuya	Anjelika/Sapor moi	Besian	Gerai
Varanus	Guieel	Terpit	Jivou-kho
SNAKES			
Python	Ulu-Bura	Thelean	Ajogor
Amphiesma stolatum	Junia		
Xenochrophis piscator	Dhura sap		Jivou Di
Bungarus fasiatus	Sankhani/ Duimukhia		Jivou Garang-Kho
King Cobra	Raj- Nag	Psujyong	
Dendrelephis	Boria/Pata alod	Psusingher	Balatem Jivou
Rhabdophis		Psuin-Kandao	
Ptyas	Masua Alod/ Gasua Alod	Khorish	Jivou Alod
Naja	Kalinag	Darat	Khoris
Typhlops	Telia sap	Wrerlen	
Trimeresurus	Lauduga	Psingargam	Jivou Natong
TURTLES			
Hardshell turtles	Kathua	Pro	Khathua
Softshell turtle	Kachim	Lahang	Khosung
Cyclemys oldhami	Heel Kathua		
Manouria ems	Kocchop		Yado
FROGS			
Amolops		Cro-own	
Rana	Suna-Beng	Cro-lom	
Rhacophorus	Gachua-beng	Crow- hoc	
Hoplobatrachus	Garu-beng		Khorma Gau Lem
Bufo	Kuni-Beng		Khorma mabra
Microhyla	Cheena Beng		

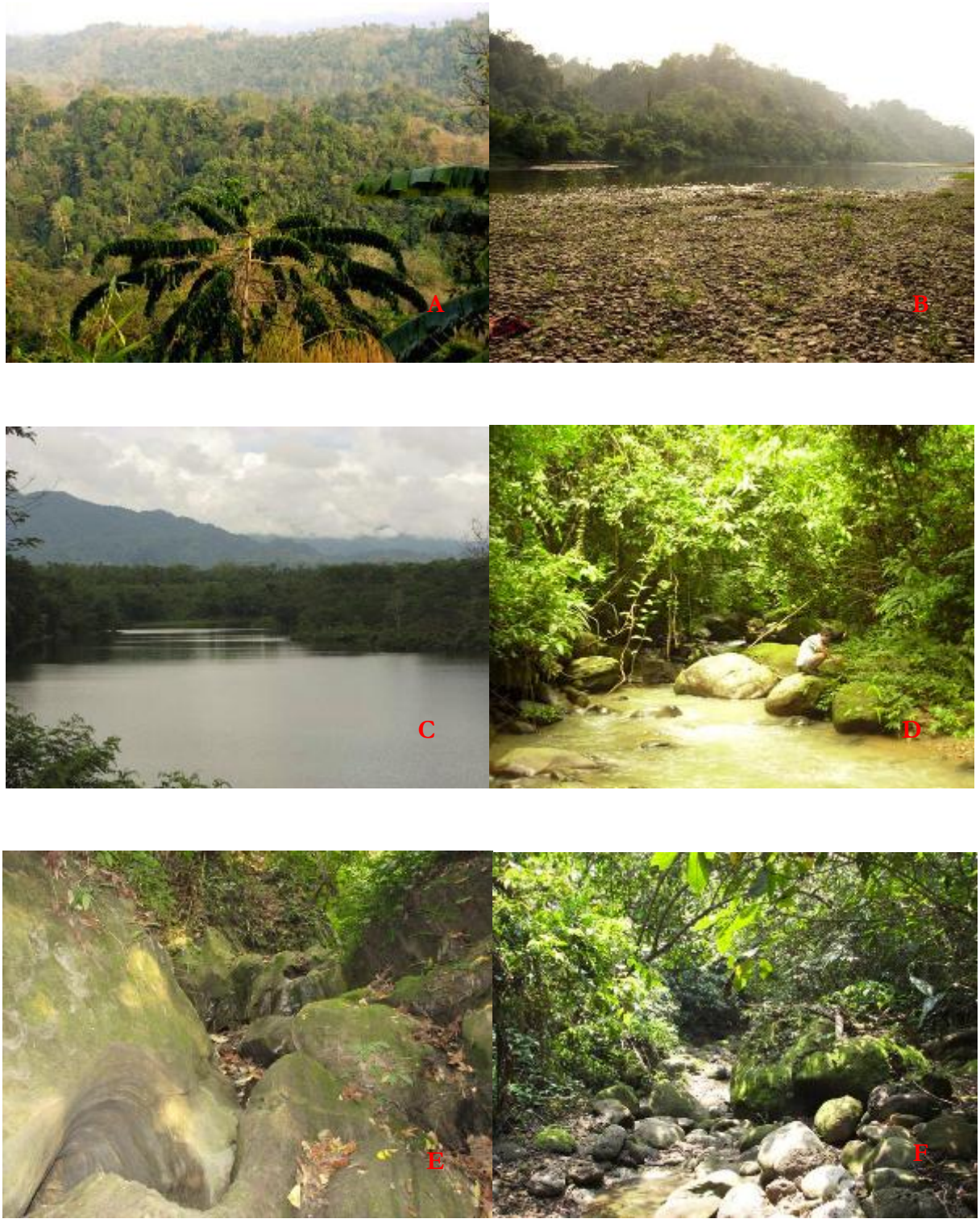

PLATE I: A: Typical Low elevation hills of Barail Wildlife Sanctuary B: Evergreen forest Patches on Jatinga River Bank and Rocky basin. C: Dolu lake, largest lentic water body at fringe of Barail wildlife Sanctuary, D: Gubicherra Stream, Vegetation growing on Rocks are key microhabitat for Amphibians. E: Adakuchi Basti Nullah, Rocky streambed habitat of *Occidozyga sp* and *Tropidophorus assamensis*. F: Forest Stream during Pre monsoon period. Thick leaflitter on sides with rocks provide habitat for *Japalura planidorsata*.

PLATE II. A. Sandy seasonal Stream of Tellacherra Nullah with thick streamline vegetation, habitat of *Calotes sp.*. B: Panjhum at the Fringe of BWS, C: Fast Flowing rocky Borthol stream, habitat of *Amolops sp*, D: Streamline vegetation provide exceelent habitat for arboreal reptiles like this *Boiga cynea*, E: Paddy –forest edge F: Degraded forest with extensive growth of woody climbers, Habitat of *Boiga ochrecea*.

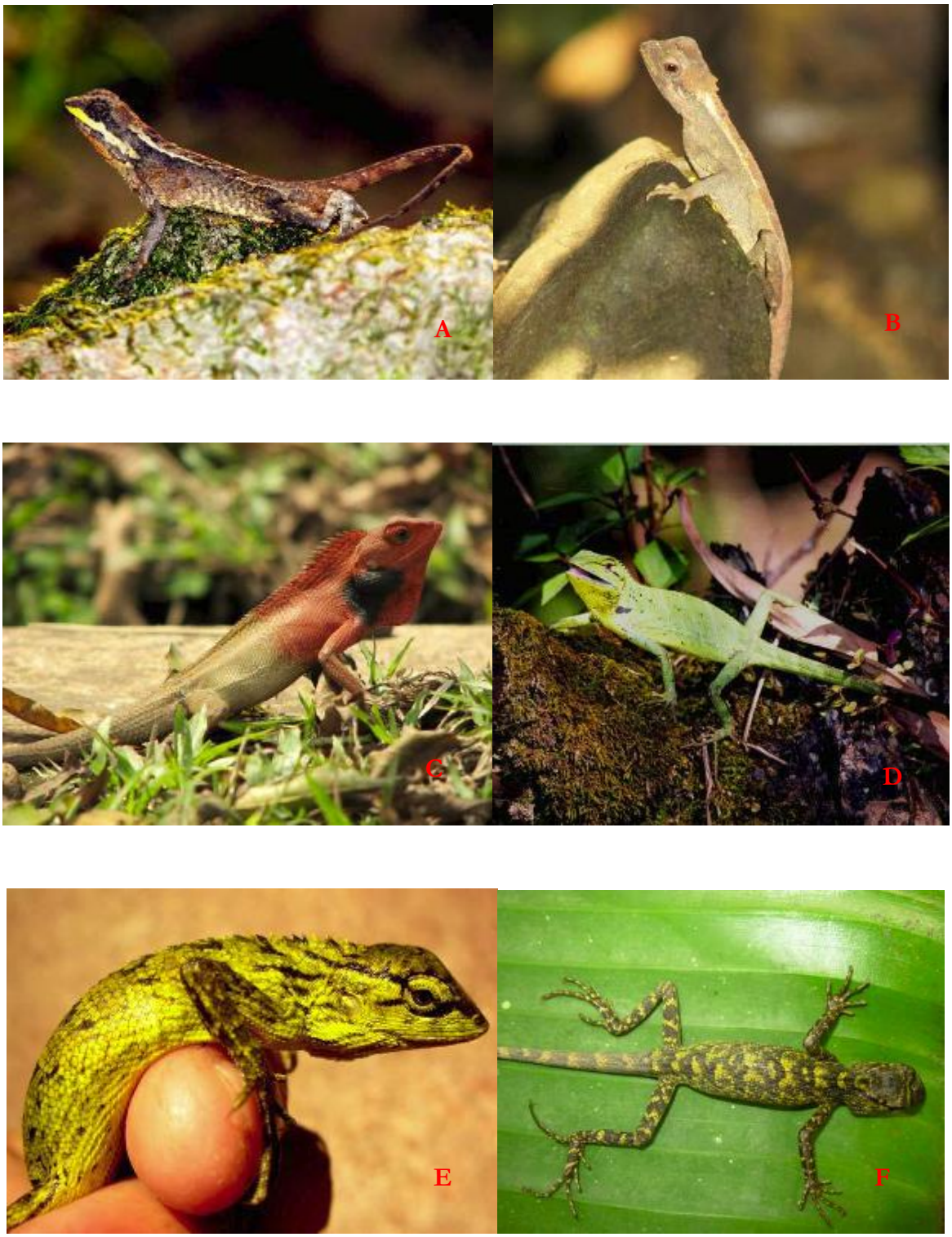

PLATE III. A: *Japalura planidorsata* (Male); B: *Japalura planidorsata* (Female); C: *Calotesversicolor* (Male); D: *Calotes jerdoni*, E: *Calotes sp. F. Calotes sp (Dorsal view)*

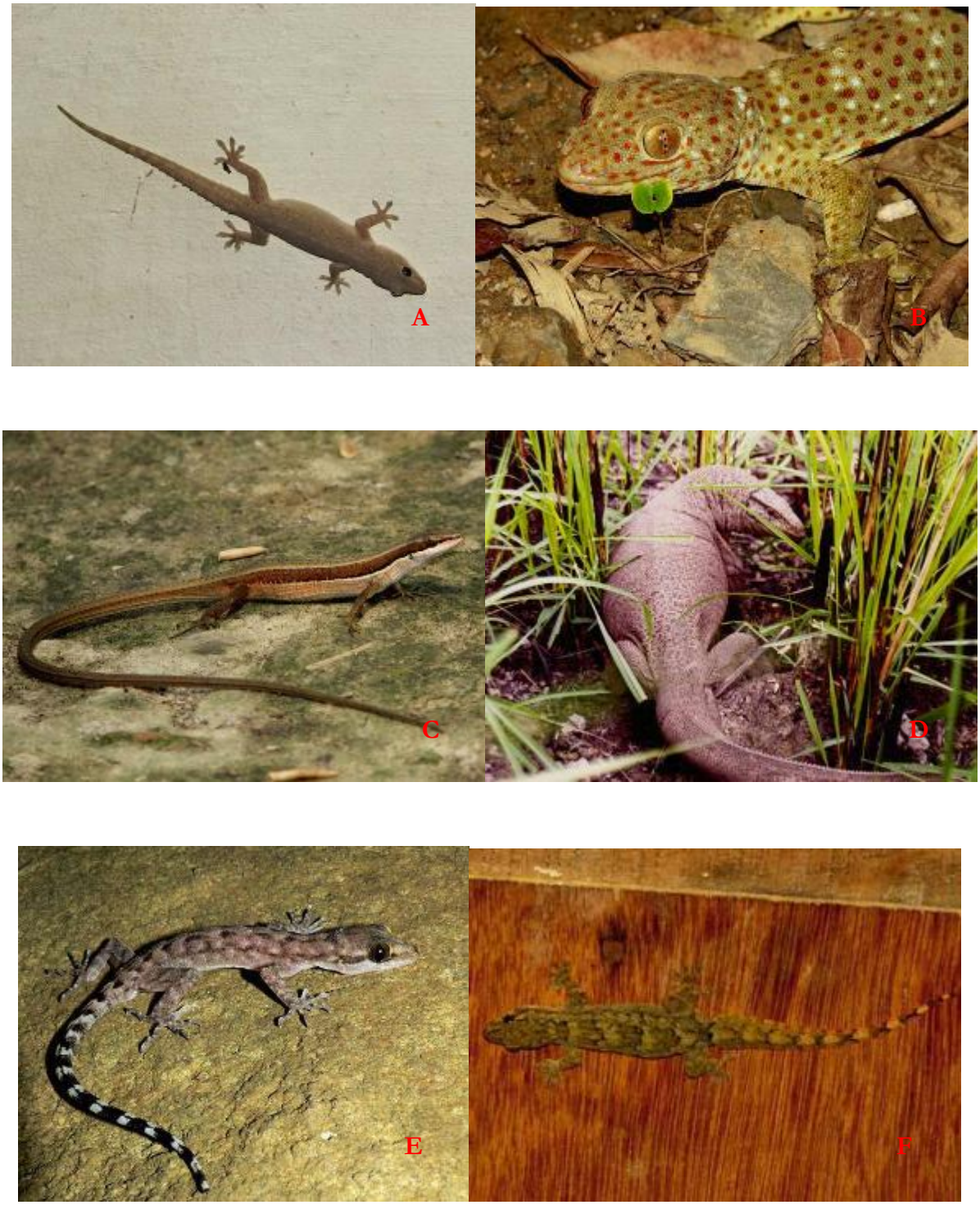

PLATE IV: A: *Hemidactylus frenatus*, B: *Gekko gecko*. C: *Takydromus khasiensis* D: *Varanus benghalensis* E. *Cyrtodactylus khasiensis* F: *Cosymbotus platyurus*

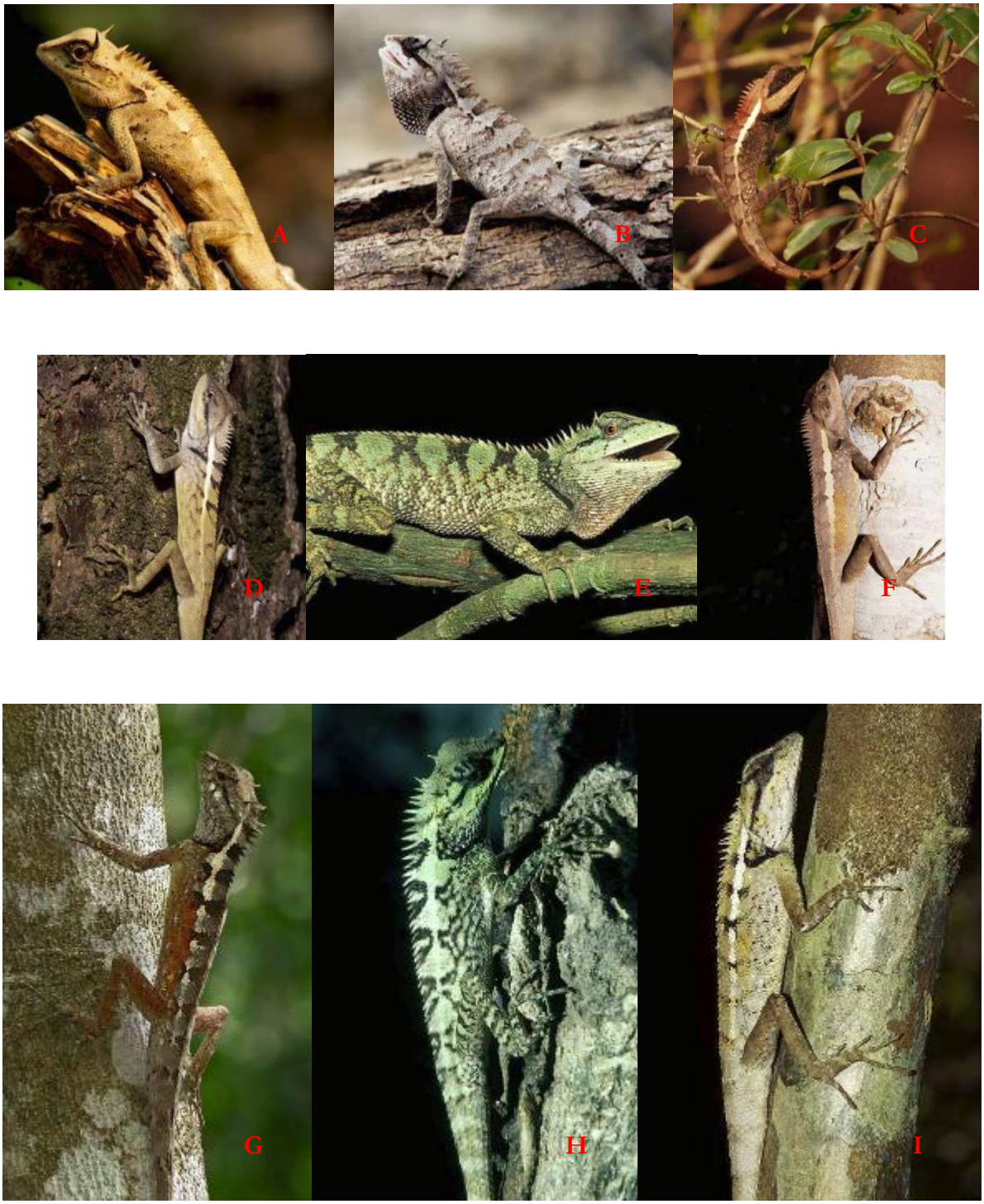

PLATE V: *CALOTES EMMA* COMPLEX Barail wildlife Sanctuary; India, B- Hershe, Mizoram, C- Central Thiland, D- North Thailand, E-Central Vietnam, F- Southern Thiland, G- Southern Thiland, H- Southern Thiland, I- Central Laos

PLATE: VI: A: *Eutropis multifasciata*, B: *Eutropis quadricarinata*, C: *Eutropis macularius*, D: *Sphenomorphus maculatus*, E: *Tropidophorus assamensis*, F: Unidentified skink??

PLATE VII: A: *Amphiesma stolatum*, B: *Ahetulla prasina*, C: *Boiga cynea*, D: *Boiga ochracea*, E: *Coelognathus radiatus*, F: *Psamodynastes pulverulentus*

PLATE VIII: A: *Dendrelaphis cyanochloris*, B: *Dendrelaphis pictus*, C: *Lycodon jara*, D: *Lycodon aulicus*, E: *Ptyas korros*, F: *Ptyas mucosa*

PLATE IX: A: *Rhabdophis subminiatus*, B: *Rhabdophis sp*, C: *Pareas monticol*a, D: *Xenochrophis piscator*, E: *Python molurus bivittatus*, F: *Typhlops diardii*

PLATE X: A: *Naja kaouthia*, B: *Ophiophagus hannah*, C: *Ovophis monticola*, D: *Trimeresurus erythrurus*, E: *Bungarus fasciatus*, F: *Bungarus niger*

PLATE XI: *Duttaphrynus melanostictus*, B. *Fejervarya sp* 1. *Microhyla ornata*, D. *Microhyla cf butleri*, E. *Kaloula pulchera*, F. *Leptobrachium smithi*

PLATE XII: A. *Fejervarya sp.* 2. *Euphlyctis cyanophlyctis.* C. *Limnonectes laticeps.* D. *Occidozyga sp*E: *Fejervarya sp*3. F. *Hoplobatrachus tigerinus*

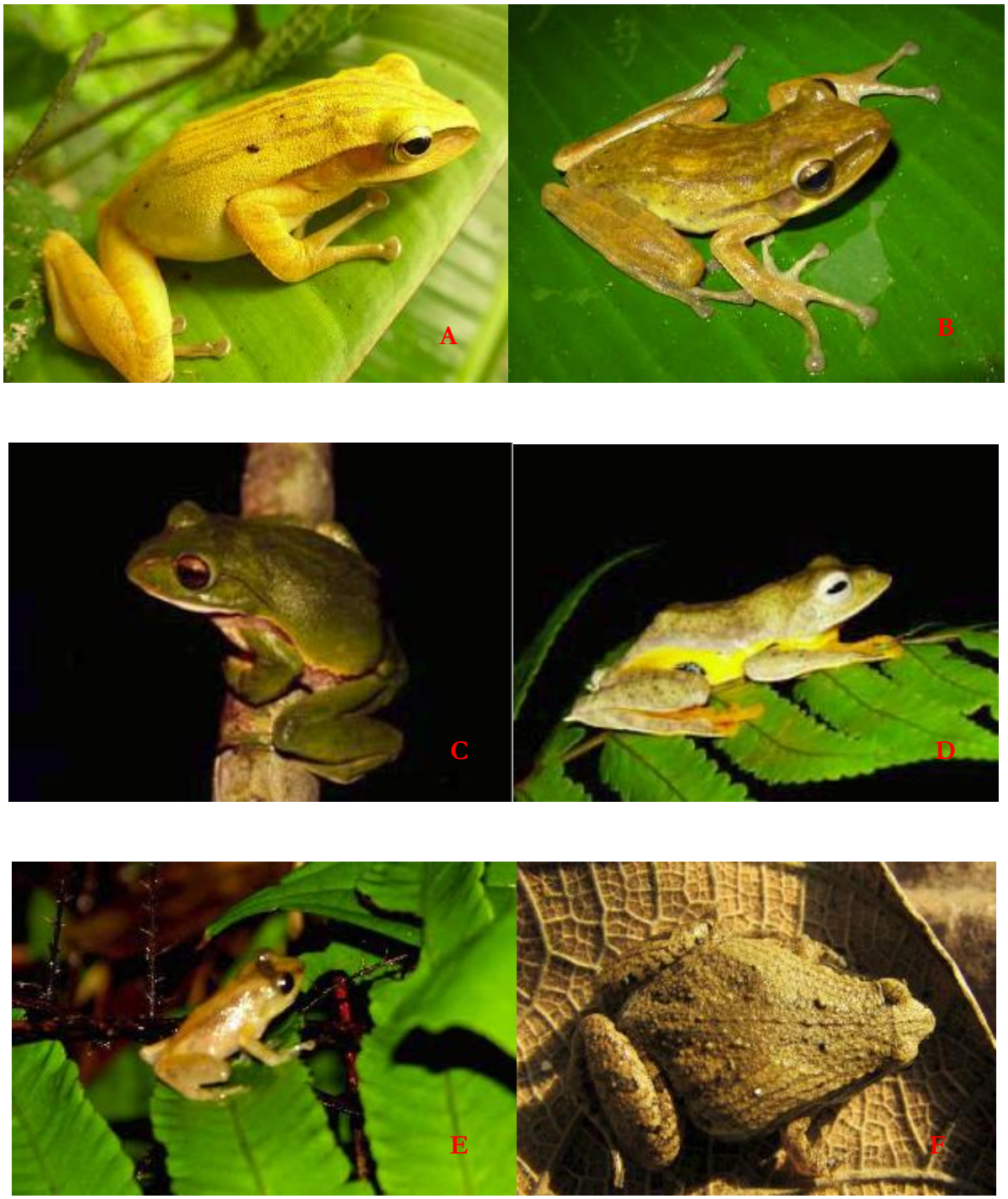

PLATE XIII: A. *Polypedates leucomystax* B. *Polypadates sp*, C: *Rhacophorus maximus* D: *Rhacophorus bipunctatus* E: *Philautus sp* F: *Microhyla sp*.

PLATE XIV: A: *Humerana humaralis*, B: *Nasirana alticola*, C: *Silvirana leptoglossa*, D: *Silvirana taipehensis* E: *Limnonectes laticeps* (Juvenile), F: *Amolops sp.*

EDUCATION & OUTREACH PROGRAM

• Stickers representing various groups of Herpetofauna (I.e., Snakes, Lizards, Turtles and Frogs) prepared and distributed among students, researchers, forest department, and other civil bodies.

• The Barail Herpetofauna Poster is coming up within 30th September 2007.

• The important finding of the project was disseminated through leading newspaper.

• The significant findings of Barail Herpetofauna project were included while presenting a paper on "Threatened tropical Herpetofauna of Northeast India and their conservation status" at the 21st Annual General conference of Society for Conservation Biologist held at Nelson Mandela Metropolitan University, Port Elizabeth, South Africa.

• 5 number popular talks at fringe villages (Maruacherra and Barkhola) arranged and three slide shows (1 each at Assam State Zoo, Aarohan, Guwahati and Kaziranga National Park Interpretation Center) were completed during that period.

Awareness Camp

Barail Herpetofauna Poster and stickers

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Appendix 1.0 Annotated list of amphibian and reptile species recorded in the Barail wildlife Sanctuary, Assam, NE India

	Scientific Name	Common English Name	Locality Record	Microhabitat
		AMPHIBIANS		
Dicroglossidae				
1	*Limnonectes laticeps*	Flat-headed Frog	2	Under rotten leaf litter near accumulated water of stream bed, moss covered
2	*Euphylectis cyanophryctis*	Indian Skipping Frog	1,2,3,4,6,7,8,10	Lentic and lotic habitats
3	*Frezervyra sp1*	Cricket frog sp1	1,2,8,7,10	Around habitation, open field, plantation, forest edge
4	*Frezervyra sp2*	Cricket frog sp2	1,2,8,10	Around habitation, open field, plantation, forest edge
5	*Frezervyra sp3*	Cricket frog sp3	4,8,9	Rocky and Sandy Bottomed streams
6	*Hoplobatrachus tigerinus*	Indian Bull Frrog	1,2,3,8	Around habitation
7	*Occidozyga sp.*	Trickle Frog	7	Under rocks of forest stream
Ranidae				
8	*Humerana humaralis*	Bhamo Frog	4	Under leaf litter on rocky cliff of stream 3ft above
9	*S. leptoglossa*	Brown backed Oriental Stream Frog	2,3	Under log of dry stream bed and under Accumulated firewood near habitation
10	*Hylarana taipehensis*	Taipeh frog	3, 10	Among water hyacinth and vegetations of waterlogged paddy field.
11	*Nasirana alticola*	Plain Oriental Stream Frog	4,6	On overhanging vegetation of a fast flowing stream
12	*Amolops sp*	Stream Frog (!)	5, 6, 7,	Under talus with accumulated leaf litter. On large bryophyte covered rocks of fast flowing stream.
Microhylidae				
13	*Microhyla cf butlerii*	Boulenger's Narrow mouthed frog	10	Among thick bamboo leaf litter of a bamboo brake near human habitation anf forest edge.
14	*Microhyla ornata*	Ornate NarrowMouthed Frog	2,8,9,11	Around habitation, open field, forest edge among moist grass.
15	*Microhyla sp.*	!	2	Under brick pile near habitation
16	*Kaloula pulchra*	Painted Baloon Frog	1, 3, 8	Waterlogged and marshy places around habitation
Megophrydae				
17	*Leptobrachium smithi*	Red-eyed Short-leg	4,8,9	One caught from exposed boulder of forest stream. Calling recorded from secondary forest
Rhacophoridae				

18	*Philautus sp*	Bush Frog!	8,9	From leaves of shrubs of a degraded slope 3-5ft above.
19	*P. leucomystax*	Six-lined Tree Frog	1,3,4,6,8,11	Streamline vegetation 2-4fy above ground; Vegetations on large rocks and from shrubs around habitation
20	*Polepedates sp*	Tree frog sp?	6	On leaf of streamline vegetation at 3-5ft above
21	*Rhacophorus bipunctatus*	Twin-Spotted Tree Frog	9	On vegetation c.05m-1m off the ground near forest trail
22	*Rhacophorus maximus*	Large Tree Frog	3	On tree fern at c.1.5m above ground
Bufonidae				
23	*Duttaphrynus melanostictus*	Common Asian Toad	1,2,3,8	In and Human habitation, open field, agricultural lands, roadside areas.
LIZARDS				
Scincidae				
1	*E. macularia*	Bronze Grass Skink	2, 7,8,10	Dry stream bed on rock and with leaf litter, leaf litter near forest trail on a hill slope, bamboo groves around habitation
2	*Sphenomorphus maculatum*	Spotted Litter Skink	5,7	Among leaf litter and rocks near forest stream
3	*E. multifasciata*	Many-lined GrassSkink	1, 2, 3, 7, 8, 10	Among bamboo root, Leaf litter, Plantation, around habitation and inside tree holes 50cm-2 m above
4	*E. quadricarinata*	Four-keeled Grass Skink	8	On branches 2ft above water level.
5	*Tropidophorus assamensis*	North-Eastern Water Snake	4, 7	Under bryophyte covered rocks on streambed
6	*Mabuya sp*	Skink ?	4	Active on overhanging branches of a forest stream at 1-5m
Lecertidae				
7	*Takydromus khasiensis*	Khasi Hills Long Tailed Lizard	4	Among leaf litter near rocky stream
Agamidae				
8	*J. planidorsata*	Flat Backed Japalura	4,9	Among leaflitter near forest stream, on rocks of dry stream bed, tried to escape under large bryophyte covered Rock
9	*Calotes jerdonii*	Jerdon's Forest Lizard	11	On low shrubs (Ca. 1m above) near Jhum field on a slope
10	*Calotes versicolor*	Indian Garden Lizard	1,2,7,8	Around habitation on fence row and gardens, forest edge, plantation and on roadside vegetation
11	*Calotes sp.*	Forest Agamid!	4	Sleeping upside down in a thick bush at 3ft above 10 ft away from stream
12	*Calotes emma*	Spiny Headed Forest Calotes	4, 6	On gravel of stream bed; another on banana plant 1m above

Gekkonidae				
13	*Cytrodactylus khasiensis*	Khasi-hill bent toed Gecko	8	On the base of woody shrubs near forest trail
14	*Gekko gecko*	Tokay Gecko	1, 4,7,8	On ficus tree at 1-6m above. Inside old buildings; On bark (20ft above); inside old buildings
15	*Hemidatylus frenatus*	Asian House Gecko	1,2, 3, 8,10	On housewalls, walls, Ficus treeholes, Fence rows, behind advertisement board on trees
16	*C. platyurus*	Flat-Tailed Gecko	5	On tree bark at 2m off the ground
Varanidae				
17	*Varanus benghalensis*	Bengal Monitor	9	Roadside slope
SNAKES				
Typhlopidae				
1	*T. diardii*	Diard's Worm Snake	1, 8	On bark of a tree just above flood water level
Boidae				
2	*P. molurus biviittatus*	Burmese Rock Python	1, 5	Dead individual from hill slope, other rescued from fringe village area
Colubridae				
3	*A. stolatum*	Buff-Striped Keelback	1, 2, 8	Paddy field, Road-kill near habitation, around habitation
4	*D. pictus*	Painted Bronzeback Tree Snake	1, 2,8	Top frond of bushes near a degraded forest stream, one from forest trail on a plateau, another taken flood refugee among thick grass at 1.5 m above water level
5	*Dendrelaphis cyanochloris*	Green Bronzeback Tree Snake	4	Near narrow stream among streamline vegetation and steep slope on either side
6	*Oligodon albocinctus*	White barred Kukri Snake	9	Among root of a tree on a forested hill slope
7	*Lycodon aulicus*	Common Wolf Snake	1	On bamboo fence (2m above) in a house
8	*Lycodon Jara*	Yellow-specckled wolf snake	8	Crossing flooded paddy fiield at forest edge
9	*Ahetulla prasina*	Short-nosed Vine Snake	8	On banana plant ca. 2-3m above
10	*Rhabdophis subminiatus*	Red-necked Keelback	8	Among moist grass of tea garden-village edge
11	*Rhabdophis sp.*	Forest Keelback sp!	3,4	Near stream among leaf litter and under accumulated plant materials.One from Jhum field on a hill above stream
12	*Coelognathus radiatus*	Copper headed Trinket Snake	1,8	One individual among epiphytes grown on a ficus treetrunk 1m above, another from inside Human habitation
13	*Boiga ochrecea*	Tawny Cat Snake	2	Inside rotten dry bamboo
14	*Boiga cynea*	Green Cat Snake	5	On overhanging branches at 5ft above water surface
15	*P. pulverulentus*	Mock Viper	5	Among leaf litte of a plantation area

16	*Pareas monticola*	Assam Snail Eater	11	Roadkill
17	*Ptyas mucosa*	Indian Rat Snake	2, 8,10	One caught from inside house, others from around human habitations
18	*Ptyas korros*	Indo-Chinese RatSnake	1,4	Roosting at 1m above ground inside thick bush 4-5m away from flowing stream. Another from near human habitation
Elapidae				
19	*Naja kaouthia*	Monocled Cobra	1,8	Human habitation and another killed
20	*Ophiophagus hannah*	King Cobra	3,10	Recued from human habitation, Killed on a Jhum field
21	*Bungurus fasciatus*	Banded Krait	1,3	On the side of a gravel village road
22	*Bungurus niger*	Black Krait	9	While Crossing PWD road near forest
Viperidae				
23	*T. erythrurus*	Spot-tailed Pit Viper	4, 8	Among riverside vegetation at 60cm above; Near Human habitation among pumpkin stock, one adult female from overhanging vegetation of forest stream at ca. 5m above
24	*Ovophis monticola*	Mountain Pit Viper	11	Under talus near road
TURTLES				
1	*Pyxidea mouhotii*	Keeled Box Turtle	11	Collected from near rocky hill stream (Reported)
2	*Manouria emys*	Asian Giant Tortoise	9	From A bamboo thicket on a hill slope (Reported)
3	*C. oldhami*	Oldham's Leaf Turtle	5,8	Caught from leaflitter on a ridge

Appendix: 2.0 A list of Mammals recorded during Barail Herpetofauna Project

- *Hoolock hoolock hoolock* (Hoolock gibbon)
- *Macaca mullata* (Rhesus macaque)
- *Trachypithecus pileatus* (Capped Langur)
- *Sus scrofa* (wild Boar)
- *Naemorhedus sumatraensis* (Mainland Serow)
- *Herpestes sp* (Unidentified species of Mongroose)
- *Manis pentadactyla* (Chinese Pangolin; Skin of freshly killed individual)
- *Muntiacus muntjak (*Indian Muntjac)
- *Callosciurus pygerythrus* (Hoary-Bellied Himalayan Squirrel)

Appendix: 3.0 A list of Butterflies photographed during Barail Herpetofauna project (Identified by Manoj V. Nair)

- Common Jay *Graphium doson*
- Common Gull *Cepora nerissa*
- Chocolate albatross *Appias lyncida*
- Knight *Lebadea martha*
- Fluffy Tit *Zeltus amasa*
- Grass Demon *Udaspes folus*
- Forester?
- Zebra Blue *Syntarucus plinius*
- Lemon Pansy *Precis lemonias*
- Ring sp?
- Restricted Demon *Notocrypta curvifasciata*
- Chocolate Pansy
- Great Eggfly *Hypolimnas bolina*
- Common small flat *Sarangesa dasahara*
- Evening Brown *Melanitis leda*
- Common Baron *Euthalia aconthea*
- Coon
- Evening Brown *Melanitis leda*
- Chesnut Bob *Iambrix salsala*
- Common Lime
- Zezbel Red base *Delias aglaia*
- Common fire ring
- Grass demon *Udaspes folus*
- Red spot Duke
- Fulvus pied flat *Coladenia dan*
- Red Helen *Princeps helenus*
- Great Mormon *Princips memnon*
- Variegated Rajah *Charaxes kaharuba*
- Common Jester *Symbrenthia lilaea*
- Dart sp?? *Telicota sp*
- Common redeye *Matapa aria*
- Common Tiger *Danaus genutia*
- Common Bluebottle *Graphium sarpedon*
- Common Raven *Princeps nephelus*
- Ape fly
- Yellow Pansy *Precis hierta*
- Bushbrown sp
- Red spot Jezebel

Appendix 3.0 Preliminary list of Plants encountered during field survey in Barail wildlife Sanctuary (Prepared by Santanu Dey)

1. *Erythroxylon kunthianum* Wall. Linaceae	32. *Cardiospermum helicacabum* Linn. Sapindaceae	63. *Corchorus aestuans* L. Tiliaceae
2. *Hiptage acuminate* Wall. Malpighiaceae	33. *Aesculus punduana* Wall. Hippocastanaceae	64. *Triumfetta rhomboidea* Jacq. Tiliaceae
3. *Evodia triphylla* DC. Rutaceae	34. *Aphania danura* Radlk. Sapindaceae	65. *Bischofia javanica* Bl. Bischofiaceae
4. *Zanthoxylum rhetsa* DC. Rutaceae	35. *Sabia limoniacea* Wall. Sabiaceae	66. *Bridelia retusa* Spreng. Euphorbiaceae
5. *Zanthoxylum budrunga* Wall. Rutaceae	36. *Meliosma pinnata* Roxb. Sabiaceae	67. *Bridelia stipularis* Bl. Euphorbiaceae
6. *Zanthoxylum alatum* Roxb. Rutaceae	37. *Lannea grandis* A. Rich. Anacardiaceae	68. *Antidesma bunius* spreng. Euphorbiaceae
7. *Glycomis pentaphylla* Corr. Rutaceae	38. *Spondias axillaries* Roxb. Anacardiaceae	69. *Glochidion multiloculare* Muell. Euphorbiaceae
8. *Micromelum pubescens* Bl. Rutaceae	39. *Cannabis sativa* L. Cannabaceae	70. *Glochidion velutinum* Wight. Euphorbiaceae
9. *Ailanthus grandis* Prain. Simarubaceae	40. *Helixanthera ligustrina* (Wall.) Danser. Loranthaceae	71. *Croton tiglium* Linn. Euphorbiaceae
10 .*Ochna wallichii* Planch Ochnaceae	41. *Dendrophthoe falcate* (L.f.) Ettinghsausen. Loranthaceae	72. *Trewia nudiflora* Linn. Euphorbiaceae
11. *Garuga pinnata* Roxb. Burseraceae	42. *Tolypanthus involucratus* (Roxb.) VanTieghem. Loranthaceae	73. *Mallotus phillippinensis* Muell. Euphorbiaceae
12. *Canarium bengalense* Roxb.Burseraceae	43. *Viscum album* L. Nep Loranthaceae	74 .*Macaranga denticulate* Muell. Euphorbiaceae
13. *Canarium resiniferum* Burseraceae Brace.	44. *Polygonum glabrum* W Polygonaceae	75. *Ricinus comunis* Linn. Euphorbiaceae
14. *Azadirachta indica* A Juss. Meliaceae	45. *Polygonum chinense* Linn. Polygonaceae	76. *Ficus bengalensis* Linn. Moraceae
15. *Melia azedarach* Linn. Meliaceae	46. *Polygonum perfoliatum* Linn. Polygonacaea	77. *Ficus benjamina* Linn. Moraceae
16. *Dysoxylum procerum* Hiern. Meliaceae	47. *Fagopyrum cymosum* Meissn Polygonaceae	78.*Ficus retusa* Linn. Moraceae
17. *Dysoxylum binectariferum* Hk. f. et Bedd. Meliaceae	48. *Aristolochia tagala* cham Aristolochiaceae	79. *Engelhardtia spicata* Blume. Jaglandaceae
18. *Aglaia khasiana* Hiern. Meliaceae	49. *Houttuynia cordata* Thunb. Piperaceae	80. *Quercus `serrata* Thunb. Fagaceae
19. *Aglaia perviridis* Hiern. Meliaceae	50. *Piper griffithii* Cas Dc. Piperaceae	81. *Castanopsis hystrix* A. DC. Fagaceae
20. *Aglaia edulis* A. Gray. Meliaceae	51. *Piper thomsoni* Hook.f. Piperaceae	82.*Castanopsis tribuloides* A. DC. Fagaceae
21. Walsura robusta Roxb. Meliaceae	52. *Myristica amygdalina* Myristicaceae	83. *Rubus ellipticus* Smith. Rosaceae
22. *Cedrela toon*a Roxb. Meliaceae	53. *Myristica kingii* Hook. f. Myristicaceae	84. *Terminalia chebula* Retz. Combretaceae
23. *Olax aciminata* WaOlaceae	54. *Cinnamomum pauciflorum* Nees. Lauraceae	85. *Terminalia myriocarpa* Heurek et Muell. Combretaceae
24. *Ilex godajam* Coleb. Aquifoliaceae	55. *Cinnamomum cacharensis* R. N. Parker. Lauraceae	86. *Anogeissus aciminata* Wall. Combretaceae
25. *Ilex domiana* Dc. Aquifoliaceae	56. *Phoeba lanceolata* Nees. Lauraceae	87. *Eugenia macrocarpa* Roxb. Myrtaceae
26. *Hippocratea indica* Hippocrateaceae	57. *Litsea khasiana* Meissn. Lauraceae	88. *Melastoma malabathricum* Linn. Melastomaceae
27. *Zizyphus jujube* Lamk. Rhamnaceae	58. *Abroma augusta* (L.) L.f. Sterculiaceae	89. *Oxyspora cernua* Triana. Melastomaceae
28. *Gouania leptostachya* Dc. Rhamnaceae	59. *Byttneria grandiflora* DC. Sterculiaceae	90. *Lagerstroemia parviflora* Roxb. Lythraceae
29. *Vitis quadragularis* Wall. Vitaceae	60. *Heritiera papillio* Bebbome. Sterculiaceae	91. *Lagerstroemia flos-reginae* Retz. Lythraceae
30. *Vitis repens* W. and A. Vitaceae	61. *Pterospermum acerifolium* (L.) Willd. Sterculiacaea	92. *Passiflora foetida* Linn. Passifloraceae
31. *Vitis assamica* Laws. Vitaceae	62. *Sterculia gutta* Roxb. Sterculiaceae	93. *Hodgsonia macrocarpa* Hk. F. and T. Cucurbitaceae

94. *Trichosanthes palmata* Roxb. Cucurbitaceae	96. *Tetrameles nudiflora* R. Br. Datiscaceae	98. *Eryngium foetidum* Linn. Apiaceae
95. *Begonia roxburghii* A. DC. Begoniaceae	97. *Hydrocotyle javanica* Thunb. Apiaceae	99. *Brassaiopsis speciosa* Dcne. Araliaceae
		100. *Trevesia palmate* Vis. Araliaceae