

**A rapid herpetofaunal assessment in Lower Subansiri and
Papum-Pare District, Arunachal Pradesh, India**

**Survey Report
2020**

**Submitted by
Abhijit Das (Principal Investigator)
Bitupan Boruah (Researcher)**



**भारतीय वन्यजीव संस्थान
Wildlife Institute of India**



**Arunachal Pradesh
Forest Department**

Introduction

Northeast India lies between two global biodiversity hotspots (Mittermeier *et al.*, 2004). Faunal element of the region is known to have distinct Tibeto-Yunnanese, Indo-Malayan and its own endemic signature (Das, 1996). Northeast India often referred as a biogeographic gateway through which faunal interchanges have taken place between Peninsula and Asiatic biota (Mani, 1974). Complex biogeography of the region is attributed to its age, unique plate tectonic and palaeoclimatic history, location at the confluence of distinct realms (Afrotropic, Palearctic, and Indo-Malay (Olson & Dinerstein, 2002). Diverse biota of the region is accredited to wide physiognomic range (e.g. altitude ranging from 100 to > 7000 m above sea level) and forested and wetland habitat diversity (from tropical to alpine; Champion & Seth, 1968; Puri *et al.*, 1989). Mountain chain of eastern Himalaya, northeastern hills (Barail, Khasi, Garo, Jaintia) and rivers such as Brahmaputra and Barak of the region are key elements shaping the faunal distribution of the region. In case of birds, Ripley & Beehler (1990) identified the Brahmaputra River as the single most important biogeographic feature in North-east India. It is thus apparent that deep valleys created by Brahmaputra River Basin are perfect platform to understand geographical drivers in speciation and endemism.

Biogeographic barriers such as Wallace's Line, Isthmuses of Tehuantepec and Panama and Himalaya are known for their barrier effect in genetic divergence. However, importance of Brahmaputra River basin in shaping biogeographic process northeastern part of India is hitherto unknown. Being primitive, less vagile and sensitive to climatic changes, herpetofauna are model organism for testing these hypotheses (Pounds & Jackson, 1981; Gascon *et al.*, 1998). Unfortunately, the amphibian and reptilian fauna of Northeast India are poorly documented and not well understood especially phylogeny and biogeography of the species.

Methodology

Study area: The present study was carried out during October 2019 in Potin (27° 20' 52.30" N, 93° 50' 58.93" E) and Talle Wildlife Sanctuary (27° 32' 52.81" N, 93° 53' 44.94" E) of Lower Subansiri district and Lichi (27° 23' 03.54" N, 93° 53' 53.83" E) of Papum Pare district, Arunachal Pradesh.

Potin comes under Yachuli forest division. We conducted the study along Ranga Nadi river (downstream of the Ranga Nadi Dam) and its tributaries. The area covered by degraded Subtropical Broad-leaved Forest and cultivation field. Perennial streams such as Paro, Pati contributed to Ranga Nadi from the southern slope of the river. Streams in the area are fast flowing to moderately flowing with bedrock and boulders. Forest floor covered by shrubs and ferns.

In Lichi, we conducted the study along Ranga Nadi river. It is located approximately 20km towards east from Potin. The area comes under Banderdewa forest division. Here the Ranga Nadi river is comparatively wider than in Potin. The catchment of the river covered with degraded forest and bamboo patches, settlement and agricultural land.

Talle WLS comes under Hapoli forest division. With an area of 337 km² the sanctuary is distributed across an elevational zone of 1700m to 2200m a.s.l. (Yam and Tripathi, 2016) . Forest cover of the sanctuary occupied by various forest types such as Sub-tropical Broad-leaved, Wet Temperate Broad-leaved and Temperate Conifer Forests in the higher altitudes along with dense bamboo patches. Numerous streams from the lesser Himalaya flows across the sanctuary.

Methods: We conducted nocturnal Visual Encounter Survey (VES) to record the herpetofaunal species (Heyer et al., 1994). We actively surveyed along streams, forest trails, forest floors, road side and cultivation fields. We also employed diurnal survey for basking

reptiles. Microhabitat, geographical co-ordinate of the encountered species were recorded. Photographs of the recorded species were taken in natural habitat.

Results:

We recorded total 36 species of herpetofauna belonging to 29 genera and 11 families (**Table 1**). The species assemblage includes Dicroglossidae (16.67%), Rhacophoridae (13.89%), Ranidae (11.11%), Bufonidae (8.33%), Megophryidae (2.78%), Colubridae (19.44%), Viperidae (8.33%), Natricidae (2.78%), Agamidae (8.33%), Scincidae (5.56%), Gekkonidae (2.78%). Among the three study sites, species richness was high in Potin (24 species), followed by Talle WLS (8 species) and Lichi (7 species).

Additional information on Tortoise and Turtle:

During interaction with local community in Lichi village we recorded secondary information on turtles and tortoises. On 18th October, 2019, we found a shell of Impressed Tortoise (*Manouria impressa*) (Carapace length- 29cm, and width- 20cm) (**Fig: 3A**), which was killed for consumption two years back (as per owner). According to the villager it was found around the vicinity of the village. As per the interview the species is likely occurs around muddy or slushy area, near fallen logs and mushroom growing areas during monsoon season. We found another species, Keeled Box Turtle (*Cuora mouhotii*) (Carapace length- 16.7cm and width- 11.7cm) (**Fig: 3B**) keeping as pet, which we later on released in nearby forest.

Discussion:

Present study yielded 36 species of herpetofauna, of which amphibians represented by 19 species and reptiles by 17 species. All recorded amphibian species are anuran of which, *Amolops marmoratus*, *A. monticola*, *Raorchestes* sp., *Zhangixalus smaragdinus*, *Theloderma asperum*, *Ingerana borealis* and *Fejervarya* sp. were commonly observed in Potin. In Lichi species such as *Euphlyctis cyanophlyctis*, *Duttaphrynus melanostictus*, *Fejervarya* sp. were

commonly encountered. Species belonging to the genus *Liurana* were only recorded from Talle WLS. Among the recorded reptiles, snake represented by 11 species and lizards represented by six species. *Psammodynastes pulverulentus*, *Cyrtodactylus* sp., *Sphenomorphus* sp. and *Calotes jerdonii* were frequently recorded in Potin. Study also recorded rare species of reptiles such as *Boiga quincunciata* and *Pseudocalotes austeniana* from Potin and Talle WLS respectively. During the study period, species richness was high in Potin as maximum survey was carried out in Potin than that of Lichi and Talle WLS. Few species recorded in the present study are identified upto generic level or referred to closely related species as systematic study of those species is needed. However, the number of herpetofaunal species in the study region will increase with further study as the present study was carried out for a short period. Besides recorded species of herpetofauna, the present study also documents species that were either conferred to closely related species (e.g., *Polypedates* cf. *himalayanus*, *Asymblepharus* cf. *sikimmensis*) or their identity remains to be ascertained (e.g., *Nanorana* sp., *Raorchestes* sp., *Cyrtodactylus* sp.). However, the present study was carried out for a short period and it indicates the number of herpetofaunal species in the study region will increase with further systematic study.

The record of rare turtle species *Manouria impressa* from the Lichi village highlight the importance of the area for conservation priority. The species was recently reported by Mittel et al. (2019) from Yazali of Lower Subansiri district for the first time from India. Information on ecology and distribution of the species in India is still lacking. Therefore, this area can provide an opportunity for extensive survey which is needed for immediate conservation planning and awareness among the local communities.

Acknowledgements:

We are grateful to Science and Engineering Research Board, New Delhi for financial support to this project. We are thankful to PCCF, Arunachal Pradesh for granting permission to carry out the study. We thank DFO and staff, Hapoli forest division for their cooperation during the field study. We are thankful to Director and Dean, Wildlife Institute of India, Dehradun for their constant support. Our gratitude to Lishi Gunia and Punya Chada for their hard work in field during the study period.

References:

Champion, S. H., and Seth, S. K. (1968). *A revised survey of the forest types of India. A revised survey of the forest types of India.*

Das, I. (1996). *Biogeography of the Reptiles of South Asia.* Krieger Publ. Co., Malabar.

Gascon, C. Lougheed, S. C. and Bogart, J. P. (1998). Patterns of Genetic Population Differentiation in Four Species of Amazonian Frogs: A Test of the Riverine Barrier Hypothesis. *Biotropica*, 30 (1): 104-119.

Heyer, W. R., Donnelly, M. A., McDiarmid, R. W., Hayek, L. C., and Foster, M. S. (1994). *Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians.* Washington. Smithsonian Institution Press. 364 pp.

Mani, M. S. (1974). Biogeography of the Himalaya. Ecology and Biogeography in India. (eds M. S. Mani, and W. Junk). B. V. Publishers, The Hague.

Mital, A. J., Tao, B., and Das, A. (2019). *Manouria impressa* (Impressed Tortoise). *Herpetological Review*, 50(3): 523.

Mittermeier, R. A., Gil, P. R., Hoffmann, M., Pilgrim, J., Brooks, T., Mittermeier, C. G., Lamoreux, J., and da Fonseca, G. A. B. (2004). *Hotspots revisited: earth's biologically wealthiest and most threatened ecosystems*. CEMEX, México DF, México.

Olson, D. M., and Dinerstein, E. (2002). The Global 200: Priority ecoregions for global conservation. *Annals of the Missouri Botanical garden*, 199-224.

Pounds, J. A., and J. F. Jackson. (1981). Riverine barriers to gene flow and the differentiation of fence lizard populations. *Evolution*, 35: 516–528.

Puri, G. S., Gupta, R. K., Meher-Homji, V. M., and Puri, S. (1989). *Forest ecology. Volume 2. Plant form, diversity, communities and succession* (No. Ed. 2). Oxford & IBH Publishing Co. Pvt. Ltd.

Ripley, S. D., and Beehler, B. M. (1990). Patterns of speciation in Indian birds. *Journal of Biogeography*, 639-648.

Yam, G., and Tripathi, O. P. (2016). Tree diversity and community characteristics in Talle Wildlife Sanctuary, Arunachal Pradesh, Eastern Himalaya, India. *Journal of Asia-Pacific Biodiversity*, 9 (2): 160-165.

Table 1: List of herpetofaunal species recorded during the study period.

Sl. No.	Family	Scientific Name	Common Name	Recorded Locality
1.	Bufonidae	<i>Duttaphrynus melanostictus</i>	Common Indian Toad	Lichi
2.		<i>Duttaphrynus</i> sp. 1	-	Potin
3.		<i>Duttaphrynus</i> sp. 2	-	Lichi
4.	Megophryidae	<i>Megophrys</i> sp.	Horned Frog	Potin
5.	Dicroglossidae	<i>Euphlyctis cyanophlyctis</i>	Indian Skittering Frog	Lichi
6.		<i>Fejervarya</i> sp.	Cricket Frog	Potin, Lichi
7.		<i>Nanorana</i> sp.	Paa Frog	Potin
8.		<i>Ingerana borealis</i>		Potin
9.		<i>Liurana himalayana</i>		Talle WLS
10.		<i>Liurana</i> sp.		Talle WLS
11.	Ranidae	<i>Amolops monticola</i>		Potin, Lichi
12.		<i>Amolops marmoratus</i>		Potin
13.		<i>Amolops</i> sp.		Talle WLS
14.		<i>Odorrana livida</i>		Potin
15.	Rhacophoridae	<i>Polypedates</i> cf. <i>himalayanus</i>		Potin
16.		<i>Zhangixalus smaragdinus</i>		Potin
17.		<i>Raorchestes</i> sp. 1	Bush Frog	Potin
18.		<i>Raorchestes</i> sp. 2	Bush Frog	Potin
19.		<i>Theloderma asperum</i>		Potin
20.	Natricidae	<i>Xenochrophis piscator</i>	Checkered Keel Back	Potin
21.	Colubridae	<i>Psammodynastes pulverulentus</i>	Mock Viper	Potin
22.		<i>Gonyosoma prasinum</i>		Potin
23.		<i>Ahaetulla prasina</i>	Short-nosed Vine Snake	Potin
24.		<i>Oriocryptophis</i>		Potin, Lichi

		<i>porphyraceus</i>		
25.		<i>Boiga quincunciata</i>		Potin
26.		<i>Ptyas nigromarginatus</i>		Talle WLS
27.		<i>Ptyas corros</i>	Indo-Chinese Rat Snake	Lichi
28.	Viperidae	<i>Viridovipera medoensis</i>	Medo's Pit Viper	Potin
29.		<i>Protobothrops jerdoni</i>		Talle WLS
30.		<i>Ovophis monticola</i>	Mountain Pit Viper	Talle WLS
31.	Scincidae	<i>Sphenomorphus</i> sp.		Potin
32.		<i>Asymblepharus</i> cf. <i>sikimmensis</i>		Talle WLS
33.	Agamidae	<i>Calotes jerdonii</i>		Potin
34.		<i>Pseudocalotes austeniana</i>		Talle WLS
35.		<i>Ptyctolaemus gularis</i>		Potin
36.	Gekkonidae	<i>Cyrtodactylus</i> sp.	Bent-toed Gecko	Potin

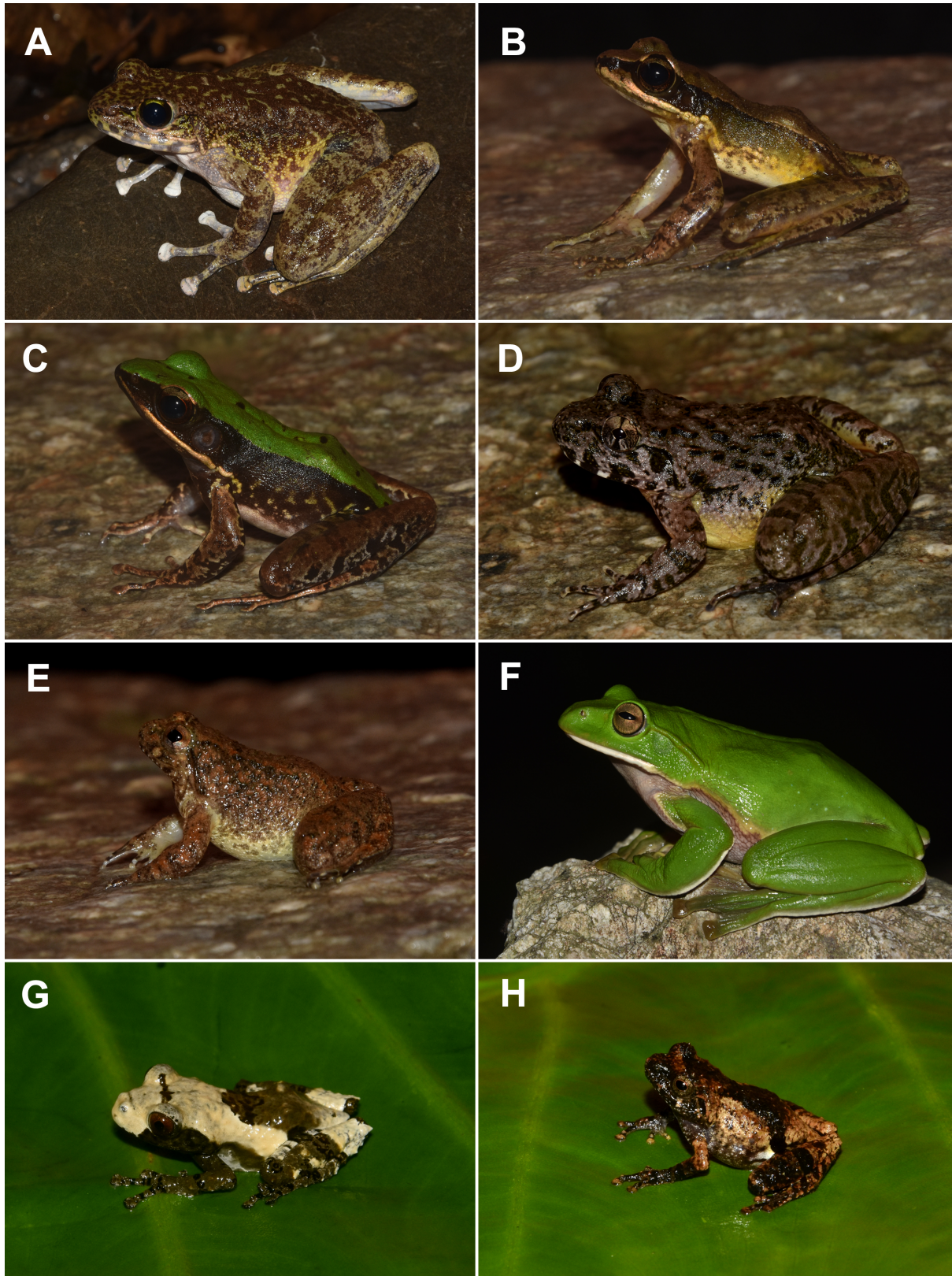


Figure 1: Anuran species recorded during the study period. **A.** *Amolops marmoratus*, **B.** *Amolops monticola*, **C.** *Odorana livida*, **D.** *Nanorana* sp., **E.** *Ingerana borealis*, **F.** *Zhangixalus smaragdinus*, **G.** *Theloderma asperum*, **H.** *Raorchestes* sp. 1.

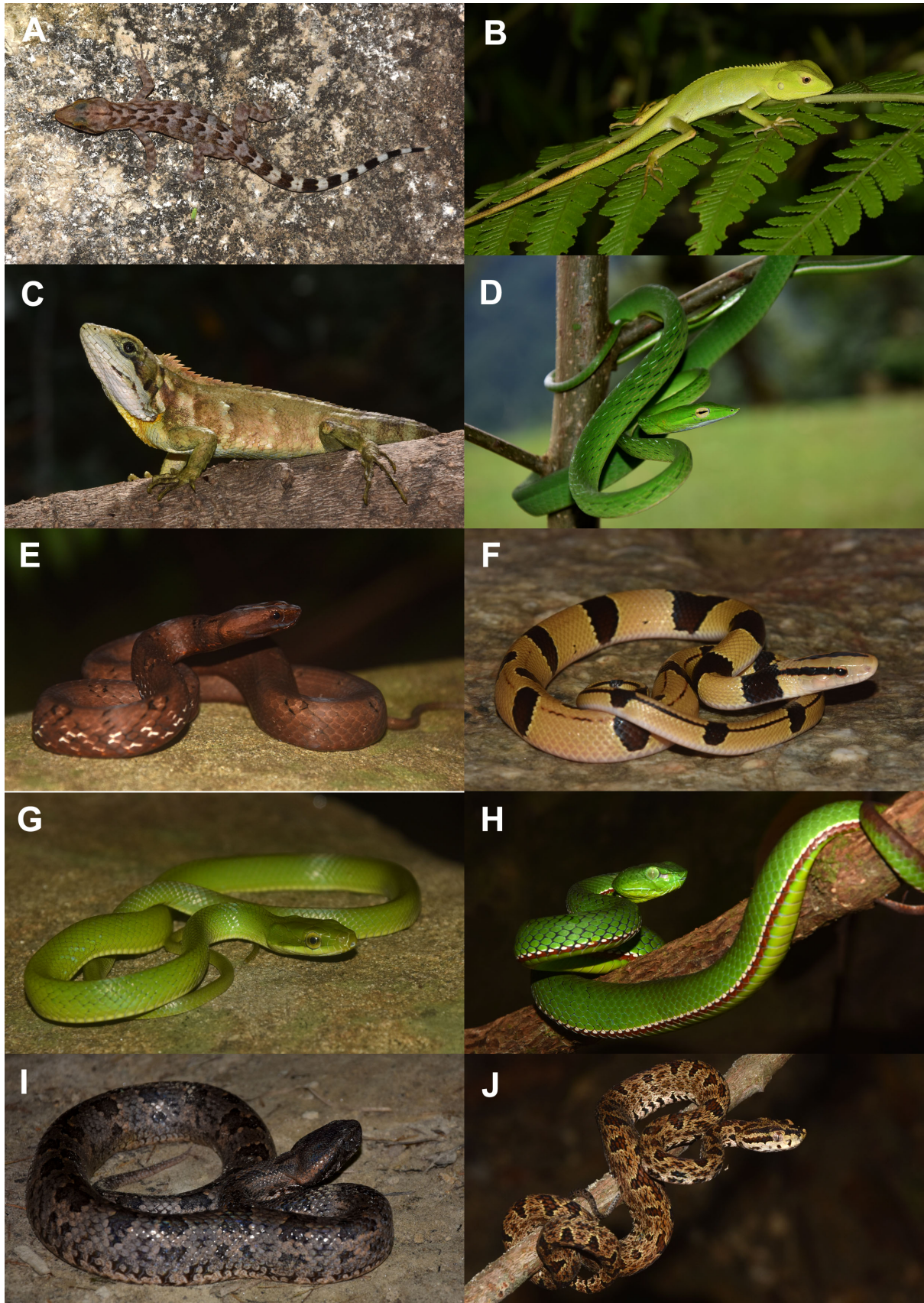


Figure 2: Reptiles recorded during the study period. **A.** *Cyrtodactylus* sp., **B.** *Calotes jerdonii*, **C.** *Pseudocalotes austeniana*, **D.** *Ahaetulla prasina*, **E.** *Psammodynastes pulverulentus*, **F.** *Oriocryptophis porphyraceus*, **G.** *Gonyosoma prasinum*, **H.** *Viridovipera medoensis*, **I.** *Ovophis monticola*, **J.** *Protobothrops jerdoni*.



Figure 3: Chelonians recorded from Lichi village. **A.** shell of *Manouria impressa*, **B.** *Cuora mouhotii*.