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Cover

Striped flying frog (*Rhacophorus lateralis*)

A small (5 cm snout-vent) brown or olivaceous, flying frog endemic to parts of Central Western Ghats. The frog does not actually fly but glides over long distances. The two lateral light stripes are characteristic of this species. Known to build a purse-like nest by folding a single leaf circularly and lays eggs inside the resulting cone.

Photo: S.R. Ganesh

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PRELIMINARY LIST OF HERPETOFAUNA IN VISAKHAPATNAM REGION, EASTERN GHATS

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Introduction

First and foremost studies on herpetofauna in Visakhapatnam were done by Patrick Russell. He wrote about many Indian snakes using vernacular names, based on his skin collections and drawings (Russell, 1796). These were later formally described by other scientists. In the next century, R.H.Beddome (1870) surveyed for herpetofauna in Visakhapatnam and described various lizards such as Jeypore ground gecko (*Cyrtodactylus jeypor ensis*), Clouded gecko (*C. nebulosu* s) and Spotted Limbless skink (*Sepsophis punctatus*). In the 20th century, McCann (1945) gave a list of herpetofauna of Visakhapatnam.

Post-independence, Das and Chanda (1998) described a new bush frog (*Raorchestes terebrans*). Das (1999) clarified the taxonomy of the Black-spotted limbless skink (*Barkudia melanosticta*). Javed et al. (2010) clarified the taxonomy of Rock gecko (*Hemidactylus maculatus*) complex. Javed et al. (2010) reported the range extension of Copperhead trinket *(Coelognathus radiatus*). Javed et al. (2010) recorded the presence of the Slender gecko (*Hemiphyllodactylus aurantiacus*). Sreekar et al. (2010) studied the egg laying behaviour of the Golden Gecko (*Calodactylodes aureus*).

Chettri and Bhupathy (2011) reported *Caladactylodes aur eus*, *Hemiphyllodactylus aurantiacus* and Elliot's Shieldtail (*Uropeltis ellioti*). Agarwal et al. (2012) rediscovered *Cyrtodactylus jeypor ensis*. Bhargavi et al. (2013) reported on the occurrence of Gunther's toad (*Duttaphrynus hololius*). Datta-Roy et al. (2013) rediscovered *Sepsophis punctatus*. Agarwal et al. (2014) described

a new caecilian *Gegenophis orientalis*. In this paper we present our preliminary investigations' results and furnish a checklist of herpetofauna we sighted.

Methods

These observations were made between 2012 and 2016. Most of the field trips were done by a team of 2-3 persons. Field trips lasted from 1 to 4 days and typically 2-3 hours during day time and 1-2 hours during night. Field trips were made during all the seasons. Since this is a preliminary investigation we followed random Ad hoc field methods. Much of the information on snakes straying into houses was collected between 2012 and 2015. As far as possible most species were photo-documented to vouch for our findings and serve in identification. Species were identified by consulting Daniel (2002).

Survey sites

We surveyed the following areas to collect data on various species of herpetofauna. The following list furnishes information on our survey sites, in the decreasing order of survey duration.

1. Simhchalam Hills: It has moist deciduous vegetation. It is a Reserve Forest with streams and seasonal ponds. Elevation varies from 100 msl to 800 msl.

2. Rushikonda- Bheemli: It is a coastal stretch with variety of vegetation types like dry deciduous, scrub forests and thorn forests. It has small estuaries in between. It even has unique red sand dunes at a certain point, along the coast line.

3. Sitakonda-Visalakshinagar: It has dry deciduous scrub jungle type of vegetation. Separated from Simhachalam hills by man-made barriers. The elevation may reach upto 400msl.

4. Kambalkonda-Zoo: It has moist deciduous to dry deciduous type of vegetation. Both are protected areas. The elevation may reach upto 600 msl.

5. Gajuwaka-sheelanagar: It has dry deciduous type of vegetation. It has mangroves in between.

6. Bakkanna Palem- PM Palem: It has moist deciduous type to dry deciduous type of vegetation. Has a huge waterbody in between. Elevation may reach upto 500msl.

7. Araku-Katiki-Paderu: It has Semi evergreen to dry deciduous type of vegetation. It has numerous streams and some waterfalls too. It receives the highest amount of rainfall in Visakhapatnam region. Elevation may reach upto 1500 msl.

8. Vizanagaram: It has dry deciduous type of vegetation. Situated at the outskirts of Visakaptanam district.

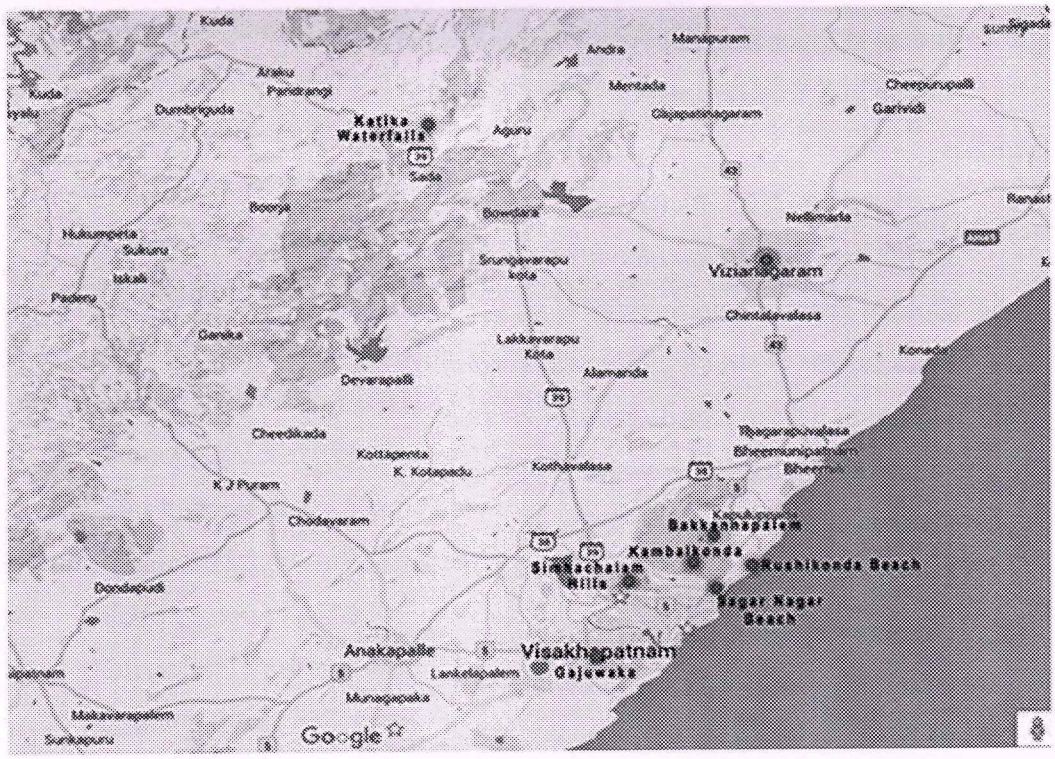

Figure 1: Satellite map of Visakhapatnam and neighboring regions, with the surveyed areas marked in black bullet.

Results

We recorded a total of 41 species of amphibians and reptiles, consisting of 1 species of toad, 4 species of frogs, 9 species of lizards, 23 species of snakes and 4 species of chelonions.

List of species

Amphibians

Common Indian toad *(Duttaphrynus melanostictus)*

Common tree frog *(Polypedates maculatus)*

Cricket frog *(Fejervarya sp.)*

Indian skipper frog *(Eupylctis cyanoplyctis)*

Indian bull frog *(Hoplobatrachus tigerinus)*

Reptiles

Rock gecko *(Hemidactylus cf. maculatus)*

Brook's gecko *(Hemadactylus brookii)*

Golden gecko *(Calodactylus aureus)*

Rock agama *(Psammophilus blanfordanus)*

Common garden lizard *(Calotes versicolor)*

Indian chameleon *(Chameleo zeylanicus)*

Keeled skink *(Eutropis craniata)*

Leschnaults lacertid *(Ophisops leschenaultii)*

Common monitor lizard *(Varanus bengalensis)*

Brahminy worm snake *(Indotyphlops braminus)*

Beaked worm snake *(Grypotyphlops acutus)*

Elliot's shieldtail *(Uropeltis ellioti)*

Saw-scaled viper *(Echis carinatus)*

Russell's viper *(Daboia russelii)*

Indian rock python *(Python molurus)*

Common sand boa *(Eryx conicus)*

Spectacled cobra *(Naja naja)*

King cobra *(Ophiophagus hannah)*

Common krait *(Bungarus caerleus)*

Banded krait *(Bungarus fasciatus)*

Indian rat snake *(Ptyas mucosa)*

Checkerd keelback *(Xenochrophis pisctator)*

Buff striped keelback *(Amphiesma stolatum)*

Green keelback *(Macropisthodon plumbicolor)*

Common wolf snake *(Lycodon aulicus)*

Barred wolf snake *(Lycodon striatus)*

Trinket snake *(Coelognathus sp.)*

Banded racer *(Argyrogena fasciolata)*

Common bronzeback tree snake *(Dendrelaphis tristis)*

Green vine snake *(Ahaetulla nausa)*

Common cat snake *(Boiga trigonata)*

Smooth water snake *(Enhydris enhydris)*

Star tortoise *(Geochelone elegans)*

Indain softshell turtle *(Lissemys punctata)*

Pond terrapin *(Melanochelys trijuga)*

Olive ridely turtle *(Lepidochelys olivacea)*

Among these, the following species were sighted as roadkills – Indian chameleon, common krait, green keelback, smooth water snake, common cat snake and barred wolf snake. In addition to the live sightings, the following were sighted as road kills as well – Indian rat snake, common bronzeback tree snake and green vine snake.

These species were encountered in wild in their natural habitats during field visits - common Indian toad, common tree frog, Indian skipper frog, Indian

bull frog, rock gecko, Brook's gecko, golden gecko, rock agama, common garden lizard, keeled skink, Leschnault's lacertid, common monitor lizard, Brahminy worm snake, beaked worm snake, Elliot's shieldtail, spectacled cobra, king cobra, buff striped keelback, trinket, banded racer, Indian softshell turtle, pond terrapin and olive ridely sea turtle.

These species were encountered only during rescues – Saw-Scaled Viper, Russell's viper, Banded krait, Indian rock python, Common sand boa,Checkeredkeelback and Star tortoise. Rest of the species were encountered as road kills, in natural habitat as well as rescued ones.

Various species of herpetofauna were found in various habitats like rocky outcrops, forests, caves, mangroves, streams, other water bodies, etc. Golden Gecko and rock Gecko were observed inside caves. Rock agama and Leschenault's lacertid were seen during daytime on rocky areas. Checkered keelback, buffstriped keelback and smooth water snake were seen in and around water bodies. Beaked worm snake, Brahminy worm snake, trinket and banded racer were seen in and around human settlements, particularly at garbage dumpyards. Cat snakes were recorded along the coastal scrub belts. Monitor lizards, rat snakes and keeled skinks were mostly seen around termite mounds. Bronzeback tree snake and green vine snake were seen on plants and trees. Indian softshell turtle and the Black pond terrapin were seen in larger, stagnant water bodies. Amphibians such as the bull frog and Skipper frog were seen in slow flowing or stagnant streams. Common Indian toad, common tree frog and Brook's gecko were seen mainly in human habitations. Rest of the species were either brought to us or rescued from human habitations.

Discussions

This is a preliminary work based on random field surveys. However, Visakhapatnam Ghats and the adjacent hills have been reported to contain several endemic species of herpetofauna, as elaborated in the Introduction. Many of the new discoveries were made from high elevation evergreen forests and those taxa were elusive ones such as nocturnal lizards and burrowing caecilians. More surveys including systematic night searches and underground sampling are needed to fully document the herpetological diversity of Visakhapatnam region.

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HERPETOFAUNAL CHECKLIST OF NAGAUR, RAJASTHAN

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Introduction

The poorly-known herpetofauna of northwestern India is threatened due to habitat loss, anthropogenic pressure and other factors (Molur and Walker, 1998). But in the absence of proper documentation and species status it is difficult to assess the extent of loss. Some documentations are available pertaining to the herpetofaunal diversity of semi arid areas of Thar Desert (Sharma, 1996; Das, 2007; Sharma *et al.,* 2010, 2011, 2013, 2016). Therefore, there is a strong need to re-evaluate the occurrence pattern, distribution including current status of herpetofaunal biodiversity and the present preliminary investigation is an attempt to fulfill this lacuna.

Study area

Nagaur (27.20°N 73.73°E; 300 m asl) is present in Rajasthan State, northwestern India. This town experiences hot summer, with frequent sand storms, extreme dryness and sporadic rainfall. Temperature ranges from 32 to 117 °F and averages around 74°F. Rainfall ranges around 35 cm per year, with precipitation happening mainly during July-September. Average humidity ranges around 50%. The Bagar lands have higher surface relief with fewer sand dunes, higher annual rainfall, and steppe-type vegetation in comparison of Marusthali. In the eastern part, the Bagar forms the Aravalli hills. The Bagar lands of western Rajasthan can be divided into second order sub-region having different geo-morphological characteristics as Luni-Sukri Basin, Nagaur-Shekhawati Region and Ghaggar Plains (Roy and Jakhar, 2002). The study area comprises certain pockets of the Nagaur–Shekhawati Region which is an undulating sandy terrain of longitudinal sand dunes, inter-dunal flats, and isolated low-lying hills with fringing pediments

along with a belt characterized by internal drainage and linear deflated areas between sand ridges and salt-soaked regions.

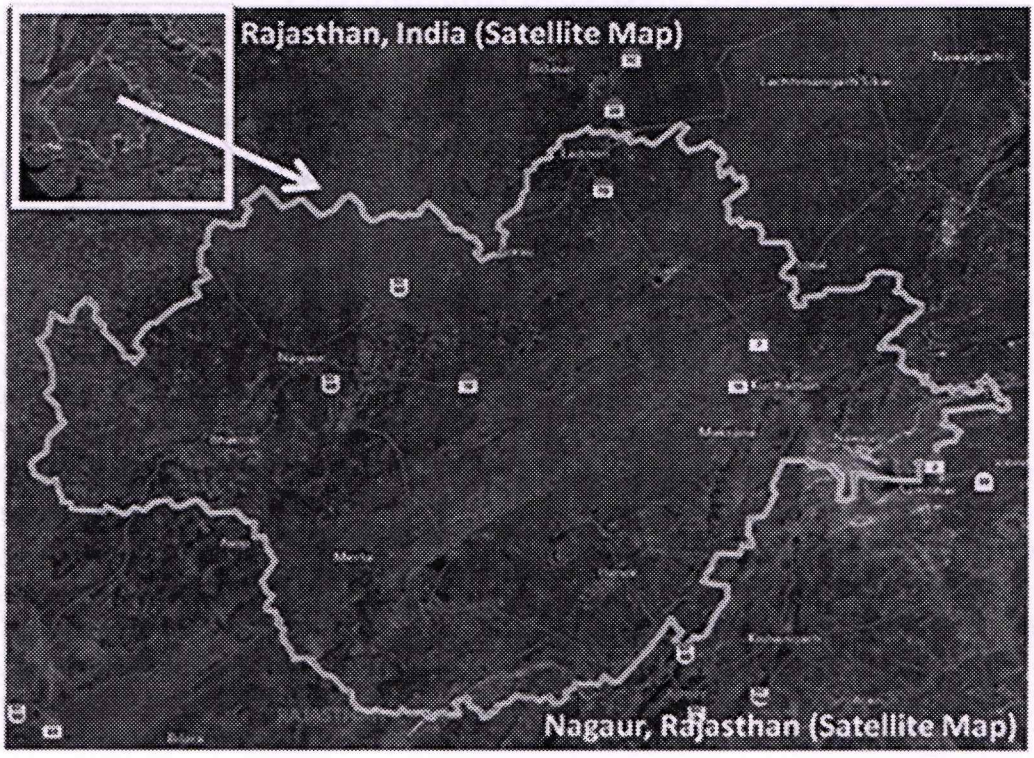

Figure 1. Satellite map of Nagaur, Rajasthan

Methodology

Herpetological surveys were conducted during 2013-16. Surveys were conducted during day and night time aiming at a variety of microhabitats such as rocky outcrops, woodland areas, forests, grasslands, water bodies, agricultural fields and even in human settlements. Representative Individuals of species observed were photographed in-situ. Special care was exercised so that the individuals were not disturbed or harmed. Species were identified using standard diagnostic keys (Murthy, 1990; Tikadar and Sharma, 1992; Dutta, 1992; Sharma, 1996, 2002; Chanda, 2002; Daniel, 2002; Daniels, 2005; Das, 2007; Whitaker and Captain, 2004). Nomenclature and classification of species are based according to Sharma (2002) and Whitaker and Captain (2004). The occurrence patterns of herpetofauna

were classified under the three groups as Common (C); Not Common (NC) and Rare (R).

Results

Overall, 31 herpetofaunal species belonging to 14 families were documented. Out of these, four species were amphibian (frogs and toads), 13 species were lizards, 13 species were snakes and one was a tortoise. Of these, 17 species were common, 10 species were not common and four species were rare in the study area. Several direct or indirect threats were identified, such as: Habitat Alteration, Habitat Destruction / Habitat Loss, Urbanization, Road Kill, Mining, Man-Wildlife Conflict (Snakebite etc.), Hunting and Poaching, Pet Practice, Orthodox Issues and Illegal Trade.

Table 1: Herpetofaunal checklist of Nagaur, Rajasthan

S. No	Common Name	Scientific Name	Occurrence
	Amphibians, Anurans, Bufonidae		
1	Marbled toad	*Duttaphrynus stomaticus*	C
	Amphibians, Anurans, Dicroglossidae		
2	Indian bull frog	*Hoplobatrachus tigerinus*	NC
3	Indian skipping Frog	*Euphlyctis cyanophlyctis*	C
4	Indian paddy field Frog	*Fejervarya* sp.	NC
	Reptiles, Lizards, Agamidae		
5	Oriental garden lizard	*Calotes versicolor*	C
	Reptiles, Lizards, Chamaeleonidae		
6	Indian chameleon	*Chamaeleo zeylanicus*	R
	Reptiles, Lizards, Geckonidae		
7	Brook's house gecko	*Hemidactylus brookii*	C
8	House gecko	*Hemidactylus f aviviridis*	C
9	Bark gecko	*Hemidactylus leschenaultii*	C
10	Keeled rock gecko	*Cyrtodactylus scabrum*	NC
	Reptiles, Lizards, Lacertidae		
11	Snake eyed lacerated	*Ophisops jerdonii*	NC
12	Large snake eyed lacerated	*Ophisops microlepis*	C
13	Fringe toed lizard	*Acanthodactylus c. cantoris*	C

	Reptiles, Lizards, Scincidae		
14	Bronze skink	*Eutropis macularia*	NC
15	Common Indian skink	*Eutropis carinata*	C
16	Three striped skink	*Eutropis dissimilis*	R
	Reptiles, Lizards, Varanidae		
17	Indian monitor lizard	*Varanus bengalensis*	C
	Reptiles, Snakes, Typhlopidae		
18	Brahminy worm snake	*Indotyphlops braminus*	C
	Reptiles, Snakes, Boidae		
19	Common sand boa	*Eryx conicus*	C
20	Red sand boa	*Eryx johnii*	C
	Reptiles, Snakes, Colubridae		
21	Indian rat snake	*Ptyas mucosa*	C
22	Glossy bellied racer	*Platyceps ventromaculatus*	C
23	Black headed royal snake	*Spalerosophis atriceps*	R
24	Common wolf snake	*Lycodon aulicus*	NC
25	Barred wolf snake	*Lycodon striatus*	R
26	Checkered keelback	*Xenochrophis piscator*	NC
27	Common cat snake	*Boiga trigonata*	NC
	Reptiles, Snakes, Elapidae		
28	Common krait	*Bungarus caeruleus*	NC
29	Spectacled cobra	*Naja naja*	C
	Reptiles, Snakes, Viperidae		
30	Saw scaled viper	*Echis carinatus*	C
	Reptiles, Tortoise		
31	Indian star tortoise	*Geochelone elegans*	NC

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A NOTE ON THE MATING SEASON OF RUSSELL'S VIPER (*DABOIA RUSSELII*) IN UDAIPUR, SOUTHERN RAJASTHAN

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Not much precise information is available in India about the mating season of the Russell's viper (*Daboia russelii*) in scientific literature (Cazaly, 1914; Daniel, 2002; Murthy, 1990; Whitaker, 1978; Whitaker & Captain, 2004). Deoras (1981) is of the opinion that Russell's vipers (*Daboia russelii*) mate from July to August. It is an ovoviviparous species which produce clutches from May to June (Das, 2002; Deoras, 1981).

While conducting rescue operations in and around Udaipur city, Udaipur district, southern Rajasthan, we made a few opportunistic observations regarding mating season of the Russell's viper, which are depicted in Table 1.

Table 1. Details of coapulating Russell's viper observed in southern Rajasthan.

Sl. No.	Date	Season	Locality	Total No. of animals seen using a common hide out	Color of hemipenis	Activity status	Time of observation (Appx.)
1.	17.12.2007	Winter	Sapetia village	2	Light violet	Mating in hibernation stage	12:30 hrs.
2.	15.11.2013	Winter	Pratap Nagar, Udaipur	2	Not observed	Mating in hibernation stage	15:30 hrs.
3.	29.10.2014	Winter	Udaipur city	2	Light violet	Mating in hibernation stage	11:00 hrs.
4.	30.10.2014	Winter	Udaipur city	2	Not observed	Mating in hibernation stage	13:00 hrs.
5.	17.11.2014	Winter	Udaipur city	2	Not observed	Mating in hibernation stage	16:30 hrs.

Though the above data are not sufficient for a generalization even then, they give a hint about the trends of mating season in Russell's vipers in southern Rajasthan. It is evident from the depicted data that Russell's viper mates during winter season when they are in hibernation. According to Deoras (1981), mating season in this species is the rainy season from July to August. Present data indicates that it mates during winter season also. Whether the same population breeds during monsoon season of the year requires further observations. There are reports that the mating season starts from winter and usually lasts till the beginning

of summer. (http://indiansnakes.org/content/russells-viper) Since gestation period extends more than six months, there may not be a second breeding season for a particular snake.

The hemipenis of this species has a light violet coloration and bears two types of spines, large and small, which can be seen on the surface when the organ is everted. The long spines are white-tipped and falcate in appearance. The sulcate sides of hemipenis are devoid of longer spines while the rest of the surfaces posses them. Rescuing heavy bodied mating snakes like the Russell's vipers need gentle handling as any forceful handling or mishandling may cause bleeding injuries on the cloacal wall of the mating female due to the curved spines of the male's hemipenis.

Since all our rescue operations were conducted during daytime, our observations regarding the mating activities of Russell's vipers are limited up to the daytime only. There is no information how long mating lasts in this species. Further observations are needed to throw light on the copulation behavior, mating season and frequency in Russell's viper.

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A CASE OF INDIAN COBRA (*NAJA NAJA*) FEEDING ON RUSSELL'S VIPER (*DABOIA RUSSELII*) IN PATTAMBI, KERALA

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Of the 102 species of snakes reported from Kerala, the spectacled cobra (*Naja naja*) and the Russell's viper (*Daboia russelii*) are among the commonest venomous snakes found in the region (Palot & Radhakrishnan, 1997; Palot, 2015). On 1st January 2015, while walking along the bund of a rice fallow plot of B block of Regional Agricultural Research Station (RARS) Pattambi (10°49'00"N; 76°12'00"E), Palakkad district, Kerala, we witnessed a rare phenomenon *viz*., a mature spectacled cobra (*Naja naja*) swallowing an adult Russell's viper (*Daboia russelii*) (Fig.1). The cobra was roughly measured to be about 1.5 m. At the time of observation, the swallowing process was already going on, and hence details of the initial processes like how the capture happened, which type of snake attacked first etc. could not be documented. From the sequence it was understood that the prey had been swallowed head first. Even though the place was crowded with farm workers, the snake swallowed the entire prey nonchalantly. It took almost one hour to finish swallowing the viper completely. After a 5 minute rest, the cobra slowly moved into the bushes nearby.

Indian cobra mainly feeds on rodents, monitor lizards, frogs, toads, small birds and small snakes (Whitaker, 1992; Das, 2002; Daniels; 2002; Captain & Whitaker, 2004). In India, ophiophagy, i.e., feeding of snakes by other snakes, is reported mainly among King Cobra, *Ophiophagus hannah*, Indian Krait, *Bungarus caeruleus*, Banded Krait, *Bungarus fasciatus*, and some species of Coral Snakes (*Calliophis* sp.) Whitaker & Captain, 2004). To a lesser extent, species like the

green vine snake (*Ahaetulla nasuta*) devours snake species (Praveen & Palot, 2016 *submitted*). Incidentally, Sri. P. Surendran (*Pers. Commn.*), a snake catcher associated with the Rapid Response Team of the Kerala Forest Department, mentioned us of a large cobra preying upon a mature Russell's viper near Perambra, Kozhikode district on 24th June 2015.

Acknowledgements

The authors are grateful to Sri. K. Ali Akbar, Lab Assistant, RARS, Pattambi, for providing the photographs of the incident and to Dr. M.C. Narayanan Kutty, Associate Director of Research, RARS, Pattambi, for the permission and encouragement. The third author is grateful to Dr. Kailash Chandra, Director, Zoological Survey of India (ZSI) and Dr. P.M. Sureshan, Officer-in-Charge, ZSI, Western Ghat Regional Centre, Kozhikode for the facilities and encouragements.

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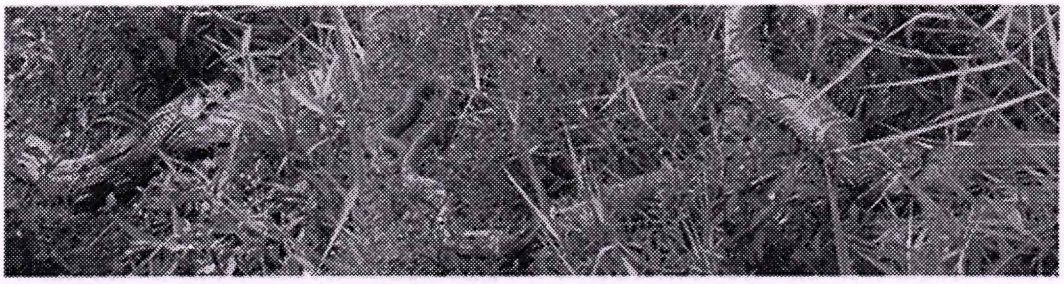

Fig. 1. Indian Cobra (***Naja naja***) feeding on Russell's viper (***Daboia russelii***)

INTERSPECIES AMPLEXUS BETWEEN INDIAN BULL FROG *HOPLOBATRACHUS TIGERINUS* AND SKIPPER FROG *EUPHLYCTIS* cf. *CYANOPHLYCTIS*

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Many abnormal amplecting behaviours have been reported among anurans like multiple amplexus, amplexus between a living male and a dead female, amplexus between two males, amplexus between a male and an inanimate object and interspecific amplexus (Ayres, 2008; Storm, 1952; Brown, 1977; Reading, 1984; Mollove *et al.*, 2010; Sharma *et al.*, 2014). Interspecific amplexus is a mating process between individuals of two different species (Sharma *et al.*, 2014). This is an uncommon phenomenon, which can occur when breeding activities of two species overlap in both space and time. Long term absence of conspecific females and explosive breeding also could lead this behaviour (Hobel, 2005 a & b; Streicher *et al.*, 2010, Sharma *et al.*, 2014).

On July 11, 2002 while visiting forest nursery at Kotra, at about 0900 hours, at the border of Phulwari-Ki-Nal Wildlife Sanctuary, we came across a subadult Indian Bull frog (*Hoplobatrachus tigerinus*) and a Skipper frog (*Euphlyctis* cf. *cyanophlyctis*) in mating posture in a small water tank of the nursery (Photo 1). Skipper frog was a male but sex of Indian bull frog couldn't be ascertained. Only these two individuals were there in the tank.

We observed the same type of behavior on July 24, 2007 at about 1000 hrs in Sajjangarh Wildlife Sanctuary. A subadult Indian bull frog and a skipper frog were present in amplexus posture in a waterhole of the sanctuary. Besides these two

species of frogs, three Indian burrowing frogs (*Sphaerotheca breviceps)* were also present in the water.

In these cases, as conspecific members of the opposite sex could not be detected nearby, probably these individuals exhibited interspecific amplexus.

Pearl *et al.* (2005), suggested that, such interspecific amplexus may have some adverse impact on the breeding success of the species involved in such amplexus. Large scale death of the species amplexed is one reason and non-availability of conspecific partners for successful breeding is another reason. Such behavior also may have some impact on the over population of a particular species and disappearance of another species. A long term study is needed to establish such situation among Indian frog species.

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Figure 1. Amplexus between Indian bull frog and Skipper frog

RANDOM HARVEST

New species of amphibians from India

A new genus and species of toad named *Blythophryne beryet* was described by S.R.Chandramouli and colleagues in vol. 555 of *Zoo Keys* journal. The new toad is a tree-dwelling species endemic to the Andaman Islands. It is a small, brown coloured toad found on plants and trees. The authors remark it to be a rather common species that had evaded the attention of field biologists thus far. It is named after Edward Blyth, associated with the Asiatic Society of Bengal, who commissioned zoological explorations in the Andaman. The species name beryet is of the local Andmanese tribesmen language, meaning a 'frog'.

A new tree frog genus, named *Frankixalus* was described by S.D.Biju and colleagues in vol. 11 of *PLoS ONE* journal. The new genus was erected for the enigmatic Jerdon's tree frog *Polypedates jerdoni* described by Albert Günther in 1876, from the Eastern Himalayas. The authors, based on their numerous collecting in several north-east Indian states and comparison with type specimens at the British Museum, performed genetic analysis to recognize this new genus. This frog now called as *Frankixalus jerdoni*, is a tree-hole breeding frog with tadpoles that feed on eggs.

A new bush frog *Raorchestes honnametti* was described by H. Priti and colleagues in the journal *PLoS ONE*. The new frog inhabits the Bilgirirangan hills, abutting the Western Ghats. This frog was named as *honnametti* after its locality of origin. The authors stress the importance of fieldwork in unsurveyed hill ranges that potentially contain many such new species. They also emphasise the need for integrative approach in taxonomy to uncover cryptic species that often escape recognition where only morphological data is used.

A new small-mouthed frog named *Microhyla laterite* was described from near Mangalore, in the Western Coastal Plains, by K.S. Seshadri and colleagues in *PLoS ONE* journal. The new frog is named after the prominent laterite soil formation of its geographic range. The authors remark that rigorous field surveys even outside Protected Areas and Biodiversity Hotspots would still yield new species like this frog.

* * * *

New species of reptiles from India

A new species of shieldtail snake named *Melanophidium khair ei* was described by David Gower and colleagues in vol. 4085 of the journal *Zootaxa*. The new species was described based on specimens from parts of Western Ghats, near northern Karnataka, Goa and Southern Maharashtra states. This one was previously mistaken to be the pied-belly shieldtail *M. punctatum*, which, as now understood, is only from the Southern Western Ghats in Anaimalai and Travancore regions. The authors comment that the new species is dedicated to Neelim Khaire, a prominent herpetologist in Maharashtra.

A new genus and species of non-venomous snake named *Wallaceophis gujaratensis* was described by Zeeshan Mirza and others in the journal *PLoS ONE*. This new colubrid snake inhabits dry arid semi-desert tracts and associated thorny scrublands of Gujarat, in northwestern India. This new species is a small-to-medium-sized snake that is brown with two parallel black stripes along the body. Its natural history, habits and conservation status are poorly known.

A paper by V. Deepak and others in vol. 85 of *Contributions to Zoology* enumerates a revised taxonomy of the fan-throated lizards of India. The lizard genus *Sitana*, long-known from India to represent a single 'widespread' species *Sitana ponticeriana* was revised. A recently recognized member *S. deccanensis* was found to be a distinct new genus, named as *Sarada*, after the Marathi name of the lizard. Three new species of *Sitana*, namely *Sitana visiri* (after the 'throat-fan' in Tamil language) from Southern Tamilnadu, *Sitana spinaecephalus* (after the spines on the head) from central and northwestern India, *Sitana laticeps* (after its broad head) in western India were described. Similarly, two new species of the new genus *Sarada*, namely *Sarada darwini* (for Charles Darwin) from northern Karnataka and southern Maharashtra, *S. superba* (after its superb and colourful throat-fan) from parts of Maharashtra were described, in addition to *Sarada deccanensis* from northern Maharashtra. This new arrangements has also, by implication, restricted *S. ponticeriana* to northern Tamilnadu and adjacent regions.

* * * *

Some recently discovered extinct reptiles

A paper by Daza and colleagues published in vol. 2 of *Science Advances* postulates hypothesis and gather supportive evidence for high reptile diversity in the tropics, both modern and extinct. The authors studied twelve fossilized lizards

from Albian-Cenomanian boundary of Myanmar (99 Million years ago) and remark them to be the world's oldest amber-preserved lizard assemblage dating back to mid-Cretaceous. The authors state that the extraordinarily intact preservation permitted many specimens to be confidently identified, e.g. stem Gekkota and stem Chamaleonidae and other crown clade members identified likewise. The authors conclude that the intact preservation of bony and soft tissue features in these specimens would facilitate their proper phylogenetic placement, and hence useful candidates for molecular divergence time-tree calibration and as additional taxa to further clarify reptilian evolutionary relationships.

Another paper by Pinheiro and colleagues published in vol. 6 this year, of *Scientif c Reports*, deals with Archosauriformes. This group of ancient animals is composed of birds, dinosaurs, crocodilians, Pterosaurs and their allies. This group has an ancient evolutionary route, dating back to the late Permian Era. They evolved prior to the end-Permian mass extinction diversifying in the Triassic Age to become dominant species during the Mesozoic Age. But yet, their origins and highly adapted body plan stills stands enigmatic. The authors describe a new extinct reptile species named *Teyujagua paradoxa* based on a near-intact skull from the Lower Triassic layer of Brazil. This new species is intermediary to the Archosauriforms and their ancestral taxa. The authors state that that unique skull has special features such as antorbital and mandibular fenestrae, serrated teeth and closed lower temporal bar. Phylogenetic studies show *Teyujagua* to be related to the Archosauriformes.

* * * *

Its not Brook's gecko anymore!

A paper by Aparna Lajmi and others in March 2016 issue of **Organisms, Diversity & Evolution** elaborates on the murky taxonomy of a common tropical Asian house geckoes – the Brook's gecko *Hemidactylus br ookii*, described way back in 1845! The paper compares the results of two earlier papers on the morphological and molecular taxonomy of these geckoes and takes a combined stance of incorporating both morphological and molecular evidences to resolve the taxonomy of Brook's geckoes. As per the conclusions in the paper Brook's gecko is restricted to S.E.Asia and the members present in India fall into six so-far hidden discrete species groups such as i. Srilankan house gecko (*H. parvimaculatus* , mainly in Eastern peninsular India), ii & iii. Kushmore gecko (*H. kushmorensis*, *H.* cf. *kushmorensis*, mainly from the arid northwest), iv. Murray's gecko (*H. murrayi*, mainly in Western peninsular India), v. Treutler's gecko (*H. treutleri*, mainly in

Deccan plateau's table land), vi. Gleadow's gecko (*H. gleadowi, H.* cf. *gleadowi*, mainly in northern and central India). The paper points out that this whole cluster of six clades shares close evolutionary relationship with the ground-dwelling *Hemidactylus* geckoes of Indian peninsula. The paper also presents a revised key to Indian *Hemidactylus* geckoes.

* * * *

Studies on Indian tree toads

A recent paper by S.R. Chandramouli and A.A.T.Amarasinghe in vol. 72 of the journal *Herpetologica*, presents a taxonomic reassessment of the Indian tree toads of the genus *Pedostibes*. The authors, based on their study of museum specimens of the two species currently attributed to *Pedsotibes*, showed that one species, the Kemp's tree toad '*P. kempii*' is actually related to the Meghalaya tree toad *Bufoides meghalayanus* and not the Malabar tree toad *P. tuberculosus* as earlier reckoned. Additionally, this paper also addressed species-level taxonomy of the recently described S.E.Asian genus *Rentapia* and synonymises Everet's toad *Rentapia everetti* under the rough toad *R. rugosa*. Detailed skeletal studies also disclosed differences between these three so far unrecognised genera.

* * * *

Sand-eating tadpoles of the dancing frogs

In a study by Gayani Senavirathne and colleagues published in March 2016 issue of *PLoS ONE*, the authors make a remarkable discovery about the first report of sand-eating behavior in Indian amphibians. The authors studied the Indian dancing frogs (genus *Micrixalus*) endemic to the Western Ghats. Based on extensive field observations, the authors note that the tadpoles actively burrowed into soil and lead their full life underground, right from the egg stage to up to advanced tadpole stages. The intermittent stages of tadpoles are characterized by an eel-like appearance, extensively muscular body and tail, reduced tail fins, skin-covered eyes, prominent tubular spiracle, large transverse processes on vertebrae II and III, absence of larval teeth rows but instead the presence of serrated jaw sheaths, among other anatomical adaptations. The authors who opened up and examined the gut-contents of many tadpoles remark them to contain mostly fine sediments of sand. The authors highlight this unique feeding behavior of the ancient and endemic dancing frogs of the Western Ghats.

* * * *

Skeletal system of the elusive purple frog

The little-known Indian purple frog *Nasikabatrachus sahyadrensis* is the most ancient of living frogs in India, endemic to parts of Western Ghats. It has a very unusual life history, with aquatic tadpoles (having a large oral sucker used to cling on to stream-side rocks) while the advanced tadpoles are subterranean, possessing adaptations for life underground. The torrent-dwelling larval tadpoles have a depressed body and head with minute eyes on top, well-developed lower and upper jaw structures. Unusually for frogs, the purple frog tadpoles retain their larval mouthparts into advanced metamorphic stages, which enable them to cling on to rocks till they approach the end of development. The resulting changes in body form and function are correlated with rapid changes in their habits and body form. The authors state that such an extreme modification in habit and body form between young ones and adults of a same species are hard to come by and presents new challenges to understanding natural history.

– B. Vijayaraghavan

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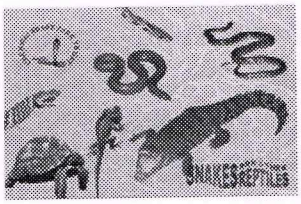

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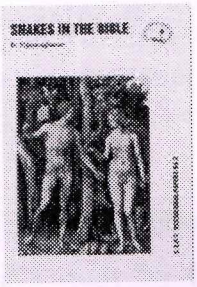

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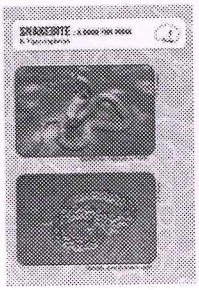

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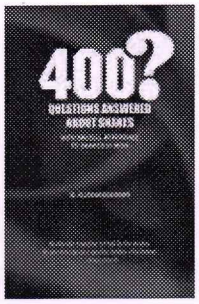

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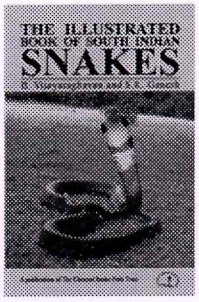

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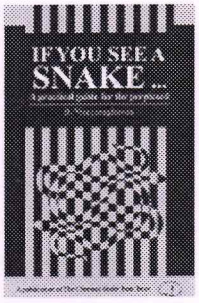

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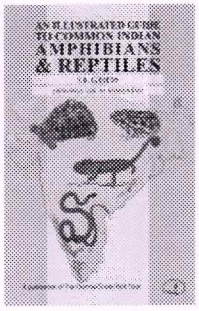

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