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J.C. Daniel
(1927 – 2011)



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REMEMBERING JC

B. Vijayaraghavan

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Rajbhavan Post, Chennai 600 022

With the demise of J.C. Daniel on August 23rd, 2011, India lost a remarkable naturalist. Time was when we had naturalists who did not confine themselves to particular specializations in their study of flora and fauna, but cast their net far and wide. The pages of the *Journal of the Bombay Natural History Society (JBNHS)* bear testimony to the wide-ranging interests of naturalists like Patrick Russell, Thomas Hardwicke, Brian Hodgson, Edward Blyth, John Anderson, Henry Godwin-Austen, Ferdinand Stoliczka, Charles McCann, S.H. Prater, M.Krishnan and Humayun Abdulali. 'JC', as he was fondly called by his friends and admirers, who were legion, could well have been regrettably the last of them. The books and papers which carried his name in one capacity or the other made valuable contributions to our knowledge of India's birds, snakes, crocodiles, turtles and tortoises, lizards and amphibians. Most others missed the wood for the trees; he missed neither.

He was a silent worker and few who had visited him at his desk at the office of the Bombay Natural History Society (BNHS) would have suspected the massiveness, diversity and comprehensiveness of his knowledge of India's wildlife.

JC joined BNHS after completing his M.Sc. Zoology, in 1950. His first posting was as Research Assistant "on the inconsiderable salary of ₹ 210" (JC's words). He worked in various capacities, as research assistant, curator, director, honorary secretary, vice president, editor of the *JBNHS* and author-anthologist and editor of various publications of BNHS. His entire service was with BNHS save for a break of five years from 1955 to 60 when he worked as a curator at the Natural History Museum, Darjeeling. Few could match his skill at meaningful engagements on several fronts. He was a complete BNHS man if ever there was one. His association with BNHS not only in terms of the long duration but also in terms of the intensity of his involvement with every aspect of its work was such that, over a period of time, he came to be increasingly identified with BNHS. This was no mean achievement especially considering that he worked in the shadow of the

greats, Salim Ali and Humayun Abdhulali. But his fame did not matter to him at the deepest level and he plodded on as if every day was a fresh beginning.

JC came under the influence of Salim Ali right from the time he joined the BNHS. Of his first meeting with JC, Salim Ali says in his autobiography *The Fall of a Sparrow* (1985): “One of the candidates selected [for a senior position in the BNHS] was a young zoology M.Sc. from Kerala who, surprisingly, seemed interested in and even eager to undertake field work, which normally involves a fair amount of sustained physical exertion and is thus usually shunned by most who can afford to. In trying to learn something more about this unconventional youth’s background I casually asked if he had ever heard of a person called Jeevanayakam in Kerala. This Jeevanayakam had been the member-secretary of a roving committee of educationists (the Statham Committee) appointed by the Travancore government in the 1930s to inquire into the alleged malpractices of state-aided private schools. While touring the state for the bird survey in 1932, I was constantly bumping into this committee in the various dak bungalows or camp sheds we had to share. Jeevanayakam had always shown great cordiality and friendliness to me and a keen interest in our bird work, but after that we had lost touch. Now here was a young man from Kerala: what more likely than his knowing about Jeevanayakam’s whereabouts? Jokingly I inquired of Daniel if he had ever heard of such a person in his native Travancore who I had known a mere twenty years before. By a one-in-ten million chance and with almost total unbelief I learnt that this Jeevanayakam was indeed none other than Daniel’s own father!”

This passage, in the context of the present obituary, is quoted not so much for the “miraculous coincidence” as described by Salim Ali but for the fact that Salim Ali, who had already established a formidable reputation for his field work, had been so impressed by the eagerness of the young man to undertake field work, contrary to the attitude of most other young, aspiring scientists. JC must have been just some 23 years of age at that time. Field work in Natural History is nothing very extraordinary nowadays but was not so 60 or 70 years ago when the work had to be done mostly in thick jungles, difficult of access and bereft of even a semblance of creature comforts for the researchers.

His long and close association with Salim Ali was a continuing source of inspiration for him. They had many traits in common – in particular, dedicated application to the work on hand, an infinite capacity for networking with scientists and lay-persons with kindred interests to promote common objectives, readiness to



encourage and support those of the younger generation in the pursuit of knowledge and, above all, a certain modesty. And very much like his mentor, he toiled relentlessly in spite of advancing age. It took a fell disease that swooped on him to stop him in his tracks.

He was a member of the Indian Board for Wildlife, Vice Chairman of the Species Survival Commission, WCU. He was the recipient of the Peter Scott award for conservation Merit by the WCU, the Indira Gandhi Paryavaran Puraskar by the Government of India and the Distinguished Service Award by the Society for Conservation Biology, USA.

Even though he himself had no doctorate, he guided ten Ph.D.s in their research. In this too he was like Salim Ali. Both proved that the lack of an academic distinction like Ph.D., conferred by a University, mattered little since it was no substitute for inherent talent and genuine expertise gained from hands-on experience. While Salim Ali deigned to accept doctorates *honoris causa* from a couple of universities, JC, if I am not mistaken, did not have even a Ph.D. *honoris causa*.

Talking of herpetology in particular, his *Book of Indian Reptiles*, published in 1983, giving the natural history of crocodiles, turtles and tortoises, lizards and snakes commonly occurring in the Indian subcontinent written for the scientists, and lay-persons alike was a refreshing contrast to the somewhat ponderous works on the subject earlier available. His *Book of Indian Reptiles and Amphibians* published in 2002 had, in fact, little to do with the 1983 publication. In this, he not only extensively revised his earlier presentation on reptiles but fleshed it out with substantial data subsequently gleaned from the pages of the *JBNHS* and, in particular, the excellent material on snakes produced by Col. Frank Wall and serialised in it. This was supplemented by an entirely new section on the amphibian fauna of India. This book has become an indispensable source of information for all herpetologists and students of herpetology in India.

He was one of the first herpetologists in recent times to conduct field surveys in the poorly known and under-explored hill ranges of peninsular India, namely, the northern Western Ghats, the Eastern Ghats and the hills of central India. Surat Dangs is a biogeographically interesting hill range where the Western Ghats in its northernmost end 'dovetails' with the Vindhya / Satpura hill ranges. This is the northernmost range of many species endemic to the Western Ghats. The result of the surveys carried out by him together with other herpetologists in this

region yielded several species previously thought to have a limited geographic range largely in the high and humid southern portions of the Ghats and these were recorded for the first time from northern Western Ghats. Examples include balloon frog (*Uperodon systoma*), Leith's frog (*Indirana leithii*), Beddome's frog (*Indirana beddomii*), Gunther's skink (*Lygosoma guentheri*) and olive forest snake (*Rhabdops olivaceus*). The subject was given an elaborate treatment with separate publications devoted to the new range extension records as well as a generalized consolidated checklist of the region. In the case of the Eastern Ghats, a most interesting finding was their rediscovery of the golden gecko (*Calodactylodes aureus*) from Tirupathi. Other noteworthy findings include the occurrence of the rock agama (*Psammophilus blanfordanus*) in hills near Madras (=Chennai) and the dwarf toad (*Bufo scaber*) from Hyderabad. In the hills of central India, they first reported the presence of the Malabar frog (*Hylarana malabarica*), a species characteristic of the Western Ghats as well as elusive, poorly-understood ones like the painted frog or Ceylon bull-frog (*Kaloula taprobanica*). Apart from these field explorations and faunistics, they immensely contributed to our knowledge of Indian amphibians although their new description *Bufo sulphureus* turned out to be invalid. His *Field Guide to the Amphibians of Western India* running into four parts, published in the *JBNHS*, still continues to be one of the seminal works on the subject. This apart, he and his team also studied tadpole morphology of Indian frogs. Their interest in amphibian studies is reflected equally well, be it in Mumbai's environs or the remote hill forests of Darjeeling in the Eastern Himalayas. Furthermore, JC along with Romulus Whitaker was involved in the conservation assessment of endangered reptiles like India's three species of crocodiles.

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LIZARD FAUNA OF KANCHEEPURAM DISTRICT, NORTHEASTERN TAMIL NADU, SOUTHERN INDIA

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Introduction

Lizards are one of the largest herpetofaunal groups in India, which, comprise of 196 species belonging to 8 of the 18 families known worldwide (Venugopal, 2010). Lizard fauna in south India, though diverse has been poorly documented. However, the general biology and distribution of Indian lizards is well documented (Daniel 2002; Das 2002; Tikader and Sharma 1992; Murthy 1990; Smith 1935). Some of them are believed to be endangered but are still abundant in certain areas of their geographic range and thus are patchy in distribution. Thus, it is necessary to monitor Indian reptiles in the wild by surveying a large number of sites periodically during specific periods of time, based on their activity patterns and breeding season. This will help in assessing changes in their species richness in an area over time. The findings of such investigations will help in evolving strategies useful in formulating conservation policies (Bhagyashri *et al.* 2003).

There are a few studies on lizard assemblages in south India. Pal *et al.* (2010) studied the biology of fan-throated lizard *Sitana ponticeriana* in a coastal habitat in Orissa which revealed results on population density, morphometrics and dietary patterns of the study species. Brown (1992) carried out a study on the microhabitat relations of lizards and snakes in Vadanemmeli area in Kancheepuram district by clustering of species in 'microhabitat niche space', which indicated the presence of spatial guilds in this habitat. Venugopal (2010) did a study on population density estimates of agamid lizards in human modified forests which revealed the need for studies to understand the role of modified habitats in supporting populations of endemic agamid lizard habitats in the Western Ghats, India. Ishwar *et al.* (2003) studied the response of agamid lizards to rainforest fragmentation in the Southern

Western Ghats and found that protection and restoration of forest fragments is necessary for the conservation of endemic agamid lizards.

Kalaiarasan (1999) studied the community structure of reptiles including lizards in scrub jungle forests of Chengalpattu M. G. R and Madras district which is now called Kancheepuram district, south India. His study revealed the existence of lizard assemblages in the study area. Of late, there is a lot of disturbance to lizard habitats in Kancheepuram district due to changes in land use patterns from agriculture to monoculture tree plantations and real estate development, resulting in loss of associated biodiversity that had been sustained well for decades. There is no conservation action plan even for the endangered species like the common Indian monitor lizard *Varanus bengalensis* (Daudin, 1802). Thus, the present survey was undertaken to study the fast disappearing lizard habitats located bordering a metropolis, Chennai, the state capital of Tamil Nadu on the east coast of south India.

Study Area

Kancheepuram district (12° 10' - 13° 02' N and 79° 34' - 80° 16' E, altitude 0.5m-230 MSL) is located in northeastern Tamil Nadu on the east coast of peninsular India and experiences both the southwest and the northeast monsoons. This district includes a variety of habitats such as hillocks surrounded by reserve forests, coastal sand-dune vegetation, scrub jungles surrounding lakes and ponds, tree plantations of both native and exotic species, paddy fields and other dry land agro-ecosystems and other vegetation; and extensions of villages and towns with concrete and semi concrete structures such as huts and 'pucca' houses. These are in fact important habitats for some species of lizards that range in size from the insectivorous nocturnal geckoes to the large and endangered predatory monitor lizard. A total rainfall of 1496 mm was recorded from the monsoon rains during the study period (2010-2011). Monthly mean maximum temperatures ranged between 28.9° C in December to 37.5° C in May and monthly mean minimum temperature ranged between 21° C in January to 27.6° C in May.

Materials and Methods

Visual encounter method as described by Campbell and Christmann (1982) was carried out during August 2010 to March 2011, marking one km long belt transects of 10 m width in the representative habitats. The habitats included various land use types such as coastal habitat, marsh land, grassland, lake bund, paddy

field, wasteland, and reserve forest. A finer scale of classification, the microhabitats such as rocks, termite mounds, concrete structures such as real estate foundations and walls, lamp posts, palm trees, grasses, bushes of *Canthium coromandelicum* and other vegetation, burrows, tree trunks, sand, ground, and litter were recorded. Identification of the individuals up to the species level was made based on Daniel (2002). Survey data of each and every sighting of lizard species collected included time of sighting, species, number of individuals, sex, size (adults, juvenile and hatchling) and type of microhabitat.

Results

A total of eleven species of lizards belonging to seven genera and four families were recorded from the various habitats available in the district. The common Indian monitor, which is considered highly endangered and listed in Schedule I of the Indian Wildlife (Protection) Act (1972), was sighted on several occasions (1.86 %) with a total of 10 sightings during the study. They were predominantly found in undisturbed areas like reserve forests. Observations on the species that were recorded during the present survey are as follows: Oriental garden lizard (*Calotes versicolor* Daudin, 1802)) was recorded in most of the land use types in Kancheepuram district and was recorded in large numbers in marshland restored habitat at Pallikaranai (12° 56' - 12° 53.7', N, 80° 12' - 80° 36.5' E) with a density of 41 lizards per hectare. It was also found using the trunks of palm trees (*Borassus flabellifer*) for basking and safety. Fan-throated lizard (*Sitana ponticeriana* Cuvier 1829) was found to use the microhabitat provided by the dwarf bush *Canthium coromandelicum* which also offered microhabitat for insects and arthropods that formed the prey of these lizards. It was found in sandy coastal areas, grass land and river bed in the study area. Indian rock agama (*Psammophilus blanfordianus* Stoliczka, 1871) was observed in the low altitude hilly area known as Thirukkalukkundram hills (12° 37' 26.7" N, 80° 03' 6.5" E) of the district. This species is associated with rocky hilly areas and reserve forest habitats of Kancheepuram district which form an extension of Eastern Ghats. During the course of the study, four lizards per hectare were recorded in Kuttakulam (12° 28' 32" N, 80° 01' 59.1" E), a hilly area with rocky outcrops. (Table I & II). Sand skink (*Eutropis bibronii* Gray 1839) was found to occupy the microhabitat provided by the ground trailer (*Spinifex littoreus*) in the sandy coastal vegetation. It was not found in any other habitats. Common skink (*Eutropis carinata* Schneider, 1801) was observed to be active in the mornings and afternoons when they hunt for small prey such as insects on the ground. It was

commonly sighted in all habitats except the coastal and was terrestrial. Snake skink (*Lygosoma punctata* Gmelin, 1799), particularly its hatchlings, were sometimes seen near human habitations. They were recorded in grassland, lake bund, paddy field and restored sites. (Table I & II). Termite hill gecko (*Hemidactylus triedrus* Daudin, 1802) was found to inhabit burrows that were used by snakes for shelter in clayey soil. They were also found in degraded rock piles near grassland. Common house gecko (*Hemidactylus frenatus* Schlegel, 1836) was not commonly seen in forested areas and was found commensal with man. In the study area, these lizards were primarily found in concrete structures in grassland habitats such as lamp posts and cement structures. Bark gecko (*Hemidactylus leschenaultii* Dumeril & Bibron, 1836), in scrubland habitats, dominated by palm trees were seen to rest on the bark. They weren't found to be fully nocturnal and could be seen in the mornings. They were found in coastal habitats, lake bunds, *Prosopis* jungle and restored sites. Reticulated gecko (*Hemidactylus reticulatus* Beddome, 1870) was found to use the microhabitat provided by rocks and stones in hilly areas of this district. They were found under rocks in grassland, reserve forests and restored sites. (Table I & II). During the survey, monitor lizards (*Varanus bengalensis* Linnaeus, 1758) were encountered in several places in a variety of habitats though a majority was found to occur in reserve forests. They sometimes took refuge in lakes to escape detection. (Table I & II).

Though some of the lizards - Indian chameleon *Chamaeleo zeylanicus* (Laurenti 1768), Brook's gecko *Hemidactylus* cf. *brookii* Gray 1845, bronze grass skink *Eutropis macularia* Blyth, 1853, three-banded skink *Eutropis trivittata* (Hardwicke and Gray, 1827) and the white-spotted garden skink *Lygosoma albopunctata* Gray, 1846, were recorded by previous workers (Kalaiaresan, 1999; Daniels and Ishwar, 1999; Daniels, 2002) in this district, these were not recorded during the present survey, and could have been overlooked. One of the possible reasons for their not being spotted could be the increased pressure on land resources from real estate business that is a major threat to the lizard habitats. But, further field work is needed to categorically confirm their absence.

Abundance: A total of 539 sightings of lizards were recorded during the present survey in various habitats. Of these sightings, fan-throated lizard was the most abundant (45.6 %), followed by oriental garden lizard (39.5 %). Other lizards like rock agama (0.74 %), termite hill gecko (0.19%), bark gecko (1.3%), house gecko (1.11%), rock gecko (0.96%), sand skink (0.95%), grass skink (6.49%), snake skink (1.3%) and common Indian monitor lizard (1.86%) were also sighted.

Microhabitat utilization: Of all the microhabitats, the most extensively used microhabitats were found to be *C. coramandelicum* bushes (26.6 %), which were followed by grass (15.9 %), bushes with other ground vegetation (13.7%), tree trunks (13.52%), sand (10.73%) and ground (5.15%). The other microhabitats that were also used but to a lesser extent were litter (4.73%), rocks (3.86 %), palm trees (2.58 %), concrete structures such as lamp posts (2.15%), termite mounds (0.43%), others (0.43 %) and burrows (0.22 %).

Table I: Habitat utilization of the study species of lizards in Kancheepuram district.

Species	C. habitat	D. habitat	Grass land	Lake bund	Paddy field	P. jungle	R. forest	R. site	River bed
Agamidae									
<i>Calotes versicolor</i>	x	xxxx	xxxx	xxx	x	xxx	xxx	xxxx	xxxx
<i>Sitana ponticeriana</i>	xxx	xxx	xxxx			x	xxx		xxxx
<i>Psammodromus blanfordianus</i>			x						
Scincidae									
<i>Eutropis bibronii</i>	xx								
<i>Eutropis carinata</i>		x	xx	xxx	x	x	x	x	x
<i>Lygosoma punctata</i>			x	x	x			x	
Gekkonidae									
<i>Hemidactylus frenatus</i>		x	x						x
<i>Hemidactylus leschenaulti</i>	x			x		x		x	
<i>Hemidactylus reticulatus</i>			x				x	x	
<i>Hemidactylus triedrus</i>			x						
Varanidae									
<i>Varanus bengalensis</i>			x	x	x		x		x

C.habitat-Coastal habitat, D.habitat-Degraded habitat, P.jungle-Prosopis jungle, R.forest – Reserve forest, R. site-Restored site XXXX-Very Common, XXX-Common, XX- Significant X-Rare

Table II. Microhabitat utilization by the study species of lizards in Kancheepuram district

Microhabitats	Cal.ver	E. bib	E. car	H. fre	H. les	H. ret	H. tri	L. pun	Var. ben	P. blan	Sitana	Total
Rocks	3	0	1	3	0	3	0	1	2	4	1	18
Termite	0	0	0	0	0	0	1	0	1	0	0	2
Concrete	5	0	1	2	1	1	0	0	0	0	0	10
Palm tree	7	0	1	1	0	2	0	1	0	0	0	12
Grass	42	0	6	0	0	0	0	4	0	0	22	74
Canthiam	14	0	1	0	0	0	0	0	0	0	109	124
Bush	34	1	2	0	3	3	0	0	1	0	20	64
Burrow	1	0	0	0	0	0	0	0	0	0	0	1
Tree	60	0	0	0	3	0	0	0	0	0	0	63
Sand	6	0	4	0	0	0	0	0	0	0	40	50
Ground	0	0	8	0	0	0	0	0	0	0	16	24
Litter	10	0	10	0	0	0	0	0	0	0	2	22
Others	0	1	0	0	0	0	0	0	0	0	1	2

Cal.ver- *Calotes versicolor*, **E.bib**- *Eutropis bibronii*, **E.car**- *Eutropis carinata*, **H.fre**- *Hemidactylus frenatus*, **H.les**- *Hemidactylus leschenaulti*, **H. ret**- *Hemidactylus reticulatus*, **H. tri**- *Hemidactylus triedrus*, **L.pun** - *Lygosoma punctata*, **Var.ben**- *Varanus bengalensis*, **P.blan**- *Psammophilus blanfordianus*, **Sitana** - *Sitana ponticeriana*

Table III: Abundance of the study species of lizards in Kancheepuram district

Species	Sightings	%
<i>S.ponticeriana</i>	246	45.6
<i>C.versicolor</i>	213	39.5
<i>E.carinata</i>	35	6.5
<i>V. bengalensis</i>	10	1.9
<i>H.leschnaulti</i>	7	1.3
<i>L.punctata</i>	7	1.3
<i>H.frenatus</i>	6	1.1
<i>E.bibronii</i>	5	0.9
<i>H.reticulatus</i>	5	0.9
<i>P.blanfordanus</i>	4	0.7
<i>H.triedrus</i>	1	0.2
	539	

Table IV: Utilization of microhabitat by the study species of lizards

Microhabitat	Records	%
<i>Canthiam</i>	124	26.61
Grass	74	15.88
Bush	64	13.73
Tree	63	13.52
Sand	50	10.73
Ground	24	5.15
Litter	22	4.73
Rocks	18	3.86
Palm tree	12	2.58
Concrete	10	2.15
Termite	2	0.43
Others	2	0.43
Burrow	1	0.21
	466	

Discussion

The present survey revealed the biodiversity of lizards present in the district. Lizards were found to use a variety of microhabitats and even in the areas where there was disturbance due to developmental activities like marking of plots for real estate where the removal of scrubland vegetation is going on. Lizards like the fan-throated lizard were found to adjust and thrive with the changed microhabitat. Monitor lizards were also found in the scrub jungle adjoining lake bunds besides undisturbed reserve forests.

The presence of monitor lizards could be considered as an indicator of biodiversity as it is in a higher trophic position than the rest of the lizards. In this fast developing district adjoining the metropolis, Chennai, the capital of the state of Tamil Nadu, there is a great pressure on lower vertebrates such as lizards, which resulted in loss of their biodiversity in some areas.

Therefore, there is an urgent need for a conservation action plan for some vulnerable species like the common Indian monitor lizard as per the Indian Wildlife (Protection) Act, 1972, which is being exploited at an unknown rate by the local people for its medicinal value. There is still a sizable population of these lizards in this district, which needs to be protected. Conversion of agricultural fields to real estate plots is also making some of the common species like the fan-throated lizard to become rarer. South west and north east monsoons provided ideal conditions of temperature and availability of food (mostly ground dwelling arthropods including insects) to the lizards, which played a major role in the reproductive biology of the lizard species.

During a study on fan-throated lizard in Karnataka, this lizard was found to exhibit diurnal variation in activity pattern (basking, foraging, seeking refuge, etc.), remaining active in the morning hours when the air temperature was 33°C (Bhagyashri *et al.* 2003). Similar behaviours were also seen during this survey and the lizard appeared in large numbers in the morning hours in the scrubland ecosystem. This lizard was also seen basking on top of dwarf bushes in the early mornings at Vadanemmeli (12° 45' -12° 8.6' N, 80° 14' -80° 43.6' E), a coastal habitat (Subramanean and Reddy, 2010).

Daniel (1969) recorded *Psammophilus blanfordanus* at the Thirukkalukkundram hills in Kancheepuram district, which was later confirmed by later workers (Kalaiarasan, 1999; Daniels and Ishwar, 1999). Another related species,



the peninsular rock agama *Psammophilus dorsalis*, has a different distribution in Western Ghats. Radder *et al.* (2005) reported the population density, microhabitat use and activity pattern of the Indian rock lizard *Psammophilus dorsalis* in rocky hilly outcrop in Dharwad district of Karnataka. Intensive monitoring on population density and its changes with seasons was studied in a coastal scrubland habitat which revealed the importance of seasonal changes in temperature and humidity that determine the bio-ecology of three common study species (Subramanean and Reddy, 2010).

Conclusion

The presence of eleven species of lizards belonging to seven genera and four families may indicate the fact that there is still considerable lizard diversity left in the Kancheepuram district. Lizard assemblages were evident in several habitats and the common Indian monitor, a top predator and a probable indicator of diversity of small vertebrates in the habitats of the district was recorded in reserve forests that are protected by law. This checklist of Saurian diversity could be considered as a platform for more intensive monitoring which we believe might yield sightings of four species previously recorded but not in this work.

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BREEDING COLOURS OF MALE COMMON GARDEN LIZARD *CALOTES VERSICOLOR* (DAUDIN) IN SOUTH INDIA

Sathish Kumar Sharma

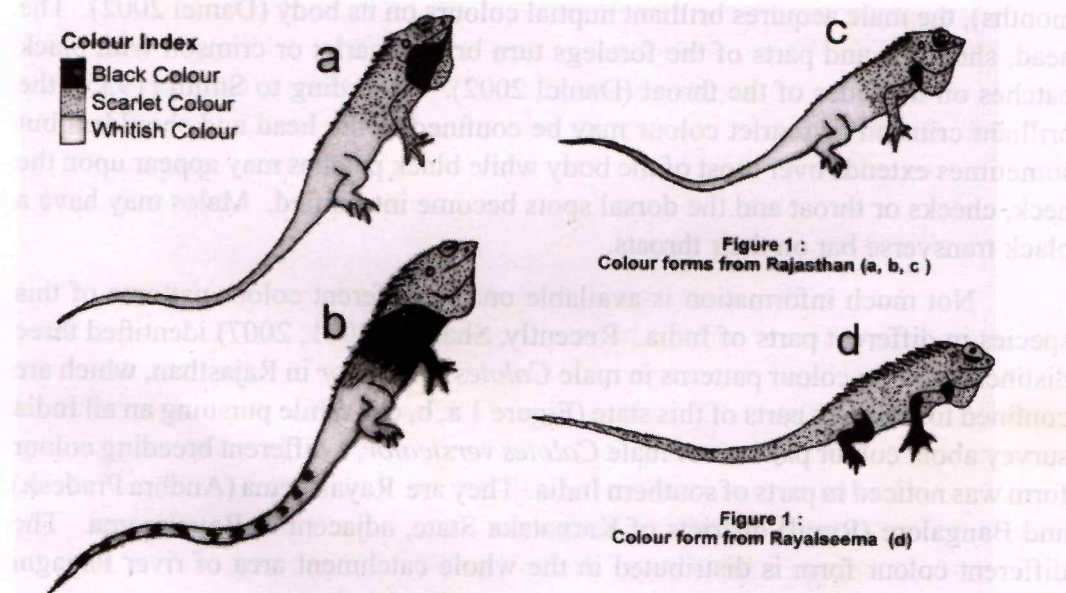
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The Common garden lizard *Calotes versicolor* Daudin, 1802, is a common arboreal, diurnal, insectivorous, agamid lizard of India, found in all biotopes, throughout the country (Smith, 1935 and Daniel 2002). This species is sexually dimorphic, with males larger than females. The adult males also have a swollen cheek and enlarged spiny crest. During the breeding season (April to September months), the male acquires brilliant nuptial colours on its body (Daniel 2002). The head, shoulder, and parts of the forelegs turn bright scarlet or crimson with black patches on the sides of the throat (Daniel 2002). According to Smith (1935), the brilliant crimson or scarlet colour may be confined to the head and shoulders but sometimes extends over most of the body while black patches may appear upon the neck, cheeks or throat and the dorsal spots become intensified. Males may have a black transverse bar on their throats.

Not much information is available on the different colour patterns of this species in different parts of India. Recently, Sharma (2001; 2007) identified three distinct breeding colour patterns in male *Calotes versicolor* in Rajasthan, which are confined to different parts of this state (Figure 1 a, b, c). While pursuing an all India survey about colour patterns of male *Calotes versicolor*, a different breeding colour form was noticed in parts of southern India. They are Rayalseema (Andhra Pradesh) and Bangalore (Rural) districts of Karnataka State, adjacent to Rayalseema. The different colour form is distributed in the whole catchment area of river Papagni (Table 1).

Table 1: Localities where a different breeding colour pattern of *Calotes versicolor* was noticed.

S.No.	Main localities where new colour pattern recorded	District	State
1	Kotireddywaripalle Kuntlapalle, Thimamma Marrimanu	Anannatpur	Andhra Pradesh
2	Chirukindapallee, Madanpalle Kotala, Batlawaripallee Kokanti, Kalicherla Khotagadapalle	Chittoor	Andhra Pradesh
3	Shriniwasapur, Chintamani Rayalpadu, Bodireddypalli Marrumkindapalli, Jargahalli Nandi Hills (foot hill areas)	Kolar	Karnataka
4	Hoskote	Bangalore (Rural)	Karnataka

Fig.1. Schematic illustrations of breeding male *Calotes versicolor* in various parts of India

Description of the different breeding colouration of *C. versicolor* in Southern India

In Southern India, when the male is in full breeding colours, scarlet colour appears over most of the body including head, front part of gular pouch, whole dorsal and ventral surface, the whole tail and the dorsal crest. The tip of the scales of the dorsal crest of the shoulder becomes whitish. Lower eye lids, fore limbs and hind limbs become blackish. A black transverse stripe is present on the throat. Posterior part of gular pouch is also black (Fig.1 d). Different intensities of scarlet or crimson and black colours can be seen during the breeding phase in the adult males.

Sometimes, when a male is under the process of colour change, particularly while losing its crimson colour, mottled black pattern may appear on its dorsum and tail region. The males of common garden lizard of the areas now studied are different in appearance from those studied earlier in Rajasthan. South Indian male garden lizards have more robust and prominent dorsal crest (pers. obs.). Behaviorally too, they are different from those of Rajasthani conspecifics. South Indian males frequently climb on to the very top of perches (e.g. electric poles), settle themselves on the upper ends and display courtship behaviour from there. While in Rajasthan and other adjacent north west Indian states, their perching heights were very low. However, difference in vegetation and ambient environment between southern and north western India, and also the resulting physiological changes in the lizard might be the reason for this.

None of three colour patterns of male *Calotes versicolor* observed in Rajasthan were seen in south India. Since the garden lizards exhibiting different colour patterns are allopatric in distribution and even the colouration and appearance of females were different (pers. obs.) *Calotes versicolor* is likely a species-complex group and needs detailed studies across the whole of its distribution range.

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Fr. CHARLES LEIGH, THE 'SNAKE FATHER'

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Fr. Charles Leigh (1881-1969), a Britisher, came to India during the colonial rule and first worked as a professor of English at the St. Joseph's College, Trichinopoly. He was the principal of that College during 1921-1923 and again from 1924 to 1927. Later, he moved on to the Loyola College in Madras. He was fondly called "the Snake Father" because he was much more than an English professor for he was interested in the natural history of snakes. He collected several snakes, even the large Indian rock pythons, and venomous ones like cobras, kraits and vipers, reared them in captivity inside the campus, made extensive observations on them, preserved them as museum specimens for future studies and even went on to publish scholarly articles in scientific journals. So much so, his contributions to Indian snake studies were taken note of by even the legendary Malcom A. Smith, whilst writing his much-acclaimed work –*The Fauna of British India. Vol. III – Serpentes* (see Smith, 1943: 548).

Fr. Leigh died while in India and was interred in the Jesuits' graveyard in Loyola College Campus adjacent to Loyola chapel.

He made his collections largely in and around Madras (12°N 79°E < 20 m asl) (now Chennai) and Kodaikanal (10°N 77°E ca. 2000-2500 m asl), a hill-station in the Pulney hills of the Western Ghats in the then Madras Presidency.

His collections are of considerable interest, notwithstanding that scientific studies on snakes began in Madras dating way back to Dr. Patrick Russell in 1796 during his research on the Coromandel Coast and that in Kodaikanal by Lt. Col. R.H. Beddome between 1863 and 1886, by Col. Frank Wall in 1923 and later by Dr. M.V. Rajendran (see Smith, 1931; Das, 2004; Vijayaraghavan, 2005; Ganesh, 2011). Fr. Leigh's specimens, preserved, identified and labeled, were divided between the Zoology Museum of the Loyola College (Raman, pers. comm.), a college in Chennai founded in 1925 and the Anglade Institute of Natural History (Matthew, 1994) a natural history museum in Shenbaganur, Kodaikanal, founded in 1895.

In his account on the Anglade Institute's natural history museum collection, Matthew (1994) writes thus "*the existing collection [of snakes in the Anglade Inst. Nat. Hist.] is a gift from Fr. Leigh made in the plains (...)there are a few interesting items: (...)the two spinal columns, one of a python (4.5 m) and a shorter one of a rat snake (...) The poisonous king cobra is represented by a 3.6 m long mounted skin (...)poisonous snakes of the Upper Palnis are the Russell's viper and the green viper; lower down are the krait, the cobra and the saw- scaled viper.*"

In a letter to *The Hindu* 9 Apr. 2009, N. Sreedharan quotes Fr. Leigh as saying that he wrote a series of articles for the *Madras Mail* "enough to make a book if reprinted". This newspaper closed down long ago and, unfortunately, the articles could not be accessed. If someone could lay his hands on them, that would be a worthwhile effort.

Fr. Leigh's collections are a good representation of the snake fauna of the concerned areas. The number of sea snakes stored at the Loyola College and the myriad hill-dwelling forms like the shieldtails and pitvipers mostly present in the Shenbaganur Museum stand testimony to this. A complete checklist of the snake species reported as collected / donated by Fr. Leigh is given below:

(Note.- # indicates presence only in Loyola College Museum; * indicates presence only in the Anglade Institute of Natural History Shenbaganur; unmarked entries are present in both the museums)

SERPENTES Linnaeus, 1758

TYPHLOPIDAE Merrem, 1820

1. Common worm snake *Ramphotyphlops braminus* (Daudin, 1803)

UROPELTIDAE Müller, 1832

2. Madurai sheildtail *Platyplectrurus madurensis* Beddome, 1877*
3. Wall's shieldtail *Brachyophidium rhodogaster* Wall, 1921*
4. Perrotet's shieldtail *Plectrurus perroteti* Duméril, Birbon & Duméril, 1854
5. Woodmason's shieldtail *Uropeltis woodmasoni* (Theobald, 1876)
6. Palni shieldtail *Uropeltis pulneyensis* (Beddome, 1863)*
7. Red-bellied shieldtail *Rhinophis sanguineus* Beddome, 1863*

PYTHONIDAE Fitzinger, 1826

8. Indian rock python (*Python molurus*)

BOIDAE Gray, 1825

9. Common sand boa *Gongylophis conicus* (Schneider, 1801)
10. Red sand boa *Eryx johnii* (Russell, 1801)

ACROCHORDIDAE Bonoparte, 1831

11. File snake *Acrochordus granulatus* (Schneider, 1799)

COLUBRIDAE Opperl, 1811

12. Indian trinket snake *Coelognathus helena helena* (Daudin, 1803)
13. Indian rat snake *Ptyas mucosa* (Linnaeus, 1758)
14. Bronzeback tree snake *Dendrelaphis tristis* (Daudin, 1803)
15. Ornate flying snake *Chrysopelea ornata* (Shaw, 1802)*
16. Banded kukri snake *Oligodon arnensis* (Shaw, 1802)
17. Russell's kukri snake *Oligodon taeniolatus* (Jerdon, 1853)#
18. Black-spotted kukri snake *Oligodon venustus* (Jerdon, 1853)
19. Common wolf snake *Lycodon aulicus* (Linnaeus, 1758)
20. Barred wolf snake *Lycodon striatus* (Shaw, 1802)#
21. Travancore wolf snake *Lycodon travancoricus* (Beddome, 1870)*
22. Common bridal snake *Dryocalamus nympha* (Daudin, 1801)#
23. Striped keelback *Amphiesma stolatum* (Linnaeus, 1758)
24. Green keelback *Macropisthodon plumbicolor* (Cantor, 1839)*
25. Checkered keelback *Xenochrophis piscator* (Schneider, 1799)
26. Olive keelback *Atretium schistosum* (Daudin, 1803)
27. Perrotet's wood snake *Xylophis perroteti* (Duméril, Birbon & Duméril, 1854)*
28. Günther's vine snake *Ahaetulla dispar* (Günther, 1864)*
29. Common vine snake *Ahaetulla nasuta* (Bonnaterre, 1790)
30. Brown vine snake *Ahaetulla pulverulenta* (Duméril, Birbon & Duméril, 1854)*

31. Common cat snake *Boiga trigonata* (Bechistein in Daudin, 1802)
32. Ceylon cat snake *Boiga ceylonensis* (Günther, 1858)*
33. Dog-faced water snake *Cerberus rynchops* (Schneider, 1799)

ELAPIDAE Boie, 1827

34. Common krait *Bungarus caeruleus* (Schneider, 1801)
35. Banded krait *Bungarus fasciatus* (Schneider, 1801)*
36. Slender coral snake *Calliophis melanurus* (Shaw, 1802)#
37. Striped coral snake *Calliophis nigrescens* Günther, 1862*
38. Bibron's coral snake *Calliophis bibroni* (Jan, 1858)*
39. Spectacled Cobra *Naja naja* (Linnaeus, 1758)
40. King cobra *Ophiophagus hannah* (Cantor, 1839)*

HYDROPHIIDAE Boie, 1827

41. Hook-nosed sea snake *Enhydrina schistosa* (Daudin, 1803)#
42. Jerdon's sea snake *Kerilia jerdoni* Gray, 1849#
43. Malacca sea snake *Hydrophis caeruleus* (Shaw, 1802)#
44. Annulated sea snake *Hydrophis cyanocinctus* (Daudin, 1803)#
45. Yellow sea snake *Hydrophis spiralis* (Shaw, 1802)#
46. Banded sea snake *Hydrophis fasciatus* (Schneider, 1799)#
47. Small-headed sea snake *Hydrophis gracilis* (Shaw, 1802)#
48. Cochin banded sea snake *Hydrophis ornatus* (Gray, 1842)#
49. Short sea snake *Lapemis curtus* (Shaw, 1802)#
50. Black and yellow sea snake *Pelamis platura* (Linnaeus, 1766)#

VIPERIDAE Gray, 1825

51. Russell's viper *Daboia russelii* (Shaw & Nodder, 1799)
52. Saw-scaled viper *Echis carinatus* (Schneider, 1801)
53. Large-scaled pitviper *Trimeresurus macrolepis* Beddome, 1862*
54. Bamboo pitviper *Trimeresurus gramineus* (Shaw, 1802)*
55. Malabar pitviper *Trimeresurus malabaricus* (Jerdon, 1854)*
56. Horse-shoe pitviper *Trimeresurus strigatus* Gray, 1845*

Besides merely collecting snakes, either for rearing in captivity or for preserving in natural history museums, Fr. Leigh subjected them to close studies. He published several scholarly articles in scientific journals which testify to his professional knowledge of the subject notwithstanding that he had no academic background in zoology. His articles still continue to be consulted and cited. He is most remembered for his works on the breeding and captive husbandry of the endangered Indian rock python.

List of publications on Indian snakes by Fr. C. Leigh:

1. 1926. Notes on snakes. *J. Bombay Nat. Hist. Soc.* 31: 227-228.
2. 1928. Notes on the Indian python. *J. Bombay Nat. Hist. Soc.* 38: 208-210.
3. 1936a. Age and growth of pythons. *Field.* 1936, June: 404.
4. 1936b. Breeding of pythons. *Field.* 1936, Dec: 1556.
5. 1948. Notes on the Fauna of British India- Reptilia and Amphibia, by Malcolm A. Smith. Volume III Serpentes. *J. Bombay Nat. Hist. Soc.* 47(2) : 399-400.
6. 1949. Egg-laying by the Indian python in captivity. *J. Bombay Nat. Hist. Soc.* 48(3): 597.
7. 1951. Egg-laying by a python in captivity. *J. Bombay Nat. Hist. Soc.* 50(1): 183.

His contributions in this field be it the increasingly dwindling art of collecting, classifying and cataloguing specimens in museums (Das, 2003) or making natural history observations on captive snakes, have all contributed in some measure to our present understanding of the subject. Furthermore, it must be remembered that all these happened during a period when there was a lull in Indian snake studies (Das, 2004 & Vijayaraghavan, 2005), i.e., between the colonial days and the 21st century. Fr. Leigh was among the few, forgotten naturalists of excellence and it is hoped that he and his contributions to herpetology will be remembered.

Acknowledgements

I thank Mr.B.Vijayaraghavan, Executive Chairman, Chennai Snake Park Trust, for entrusting this work to me, for providing me important references and for facilitating my correspondence with some vital resource persons at different stages.

Prof. Anantanarayanan Raman of the Charles Sturt Univ. Orange, Australia first drew our attention to the need for studying the work of Fr. Leigh notwithstanding that the material available was sparse. He also introduced us to many professors at the Loyola College, namely, Rev. Fr. Casimir Raj who gave biographical details about Fr. Leigh; Dr. A. T. Flemming, Head, Dept. of Zoology, who kindly permitted the examination of specimens in the collection and to photograph the portrait of Fr. Leigh; Mr. Christi Raj, lab assistant who gave important information about the tombstone of Fr. Leigh. I am grateful to my uncle, Mr. N. Ramesh, for sharing with me his videos, photos and experience after his recent visit to the Anglade Institute of Natural History.

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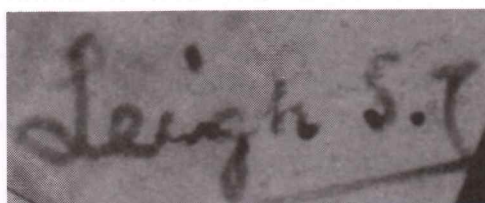
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Fr. Leigh with four pythons



His tombstone



His signature

A CASE OF AVIAN PREDATION OF THE INDIAN SKIPPER FROG *EUPHLYCTIS CYANOPHLYCTIS*

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Indian skipper frog (*Euphlyctis cyanophlyctis*) is one of the most common anuran species that is widely distributed throughout the Indian subcontinent (Chanda, 2002; Daniels, 2005; Dutta, 1997). This frog inhabits all suitable habitats in the Central Aravalli foothills and its population is stable in this part of India (Sharma *et al.*, 2010).

In spite of its stable population and widespread distribution, very little is known about the predator species associated with this anuran.

During our observation at Foy Sagar wetland of Central Aravalli foothills (26° 26' 56" N and 74° 34' 48" E) on 23-10-2011 at 17.00 h. we photographed an adult little cormorant (*Phalacrocorax niger*), a common visitor of certain wetlands here, as elsewhere in India, feeding on a frog.

The frog species was identified as skipper frog (*Euphlyctis cyanophlyctis*). After diving and seizing the prey, the cormorant remained underwater for sometime before surfacing again to consume it. The bird swallowed the frog wholly.

As to the little cormorant's predation on frogs, there are divergent accounts. Salim Ali & Dillan Ripley's *Handbook of the Birds of India and Pakistan vol.I* (1968) says "food: mainly fish; to a lesser extent also tadpoles, frogs and crustaceans" whereas Salim Ali's *Book of Indian Birds* (1996 edition) says that the bird lives "exclusively on fish" [emphasis added].

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Editor's Note:

Little cormorants feeding on frog species is already known. As far as the bird is concerned, the frog species, on this particular occasion, being identified as skipper frog (Euphlyctis cyanophlyctis) is of no significance. If the authors had found out that this is of some significance to the particular frog species from the conservation or other points of view, that would have added value to the paper.



RANDOM HARVEST

Cope and *Copeia*

It may be news to atleast some of our readers that the journal of the American Society of Ichthyologists and Herpetologists, *Copeia*, derives its name from Edward Drinker Cope, the famous American Zoologist. Angus Bellaire says in the introductory chapter of *The Life of Reptiles*, Vol.I, that Cope was “a brilliant and colourful personality whose researches ranged far and wide among living and fossil vertebrates. He was an amazingly prolific writer and his bibliography contains no less than 1395 titles...”

* * * *

‘Large-hearted’

In a paper published in *Science* 2011 Oct.28; 334 (6055), Riquelme CA, Magida JA *et al.* report a finding that the Burmese python (*Python molurus bivittatus*) display a marked increase in heart mass after a large meal. They investigated the molecular mechanisms of this phenomenon and found that the blood of this reptile has a large number of fatty acids particularly myristic acid, palmitic acid and palmitoleic acid that help in the enlargement of the heart. When they tested these acids on mice, there was a similar increase in the size of the heart.

It is hoped that this line of research could lead to finding medicines for heart diseases in humans.

Whether the Indian cousin of this snake, *Python molurus molurus*, shares this characteristic needs to be studied.

* * * *

François Marie Daudin

Detailed accounts of the life and work of the early naturalists belonging particularly to the 18th and 19th centuries are hard to come by. That being so, the International Society for the Study and Conservation of Amphibians (ISSCA) has rendered a signal service by devoting an entire issue of ALYTES – International Journal of Batrachology – (vol.28, N.1-2 Nov.2011), all of its 76 pages, to the life and contributions of François Marie Daudin (1776 – 1803) including a bibliography.

Unfortunately for most Indian readers, the text is in French but this is redeemed to some extent by a four-page summary in English, which is fascinating enough.

Notwithstanding his brief life and his being seriously handicapped since his childhood by a disability of the lower limbs and a life “full of torment”, he led an astonishingly productive life and made immense contributions to the systematics of shells, birds, amphibians and reptiles mostly from a study of museum collections. The work done by him during a period of just five years remains indispensable references in ornithology and, even more importantly, herpetology.

The paper makes a reference to the ambivalent relationship of Daudin with Bernard Lacepede (1756-1825) who held the chair of reptiles and fishes at the Museum in Paris. Lacepede allowed Daudin to examine specimens of turtles, lizards and frogs in the Museum collections but refused similar permission to examine the snake specimens. Though the author of the paper offers no explanation for this, one wonders whether this was a case of professional jealousy since Lacepede himself was a well-known herpetologist. It is not improbable that he did not consider Daudin to be a threat to him as far as turtles, lizards and frogs were concerned but he could not be equally magnanimous and helpful when it came to snakes! Scientists, in general, do not take kindly to those whom they perceive to be poachers on their turf.

The Annales des Museum d' Histoire Naturelle entrusted Daudin with the task of selecting and editing the natural history memoirs of the Museum which task Daudin executed splendidly.

Daudin wrote: “ The number of species that I have observed and described from nature is nearly three hundred and I have no doubt that this quantity would increase much if I could examine at leisure the rich collection of snakes belonging to the English and the Dutch”. But, alas! that was not to be; he died when he was just 26 years old!

* * * *

A new bronzeback tree snake from the Western Ghats

Ten species of bronzeback tree snakes of the genus *Dendrelaphis* have so far been described from India. A new species, *Dendrelaphis girii*, is now described in a paper by Gernot Vogel and Johan Van Rooijen published in the journal *Taprobanica*. This species is named after Varad Giri, a well-known herpetologist



of the Bombay Natural History Society. Previously, this new species was confused with a similar-looking Sri Lankan species *D. bifrenalis*, but, in the present study, the authors establish that the Indian population, once referred to as *D. bifrenalis*, is distinct in several respects, particularly the absence of bold ventrolateral stripes, the postocular streak being smaller and the snout being more rounded, in addition to some aspects of scalation. This new species is currently distributed in the Western Ghats, south of Pune. The authors mention that their finding of a new species of an Indian-Sri Lankan lineage further strengthens the view that the Indian fauna is distinct from its Sri Lankan counterpart in more respects than earlier appreciated.

* * * *

Snakes on moonlit roads

As is well-known, snakes like to rest on roads at night. The cold-blooded creatures find this a convenient way of absorbing the warmth of the road-surface heated up during day-time.

In this connection, Carl Kauffeld says (*Snakes and Snake Hunting*, 1957): "For reasons not clear to me, snakes seem to shun moonlit roads; whether or not they sense that they become more conspicuous at such times I cannot say, for, otherwise, they seem quite oblivious to their exposed position on the road surface".

I am not aware of any other observations on this quaint phenomenon.

* * * *

New species of lizards and snakes discovered

Recently, five new species of lizards (four chameleons and a skink) as well as a new species of sea snake have been discovered. Glaw *et al.* (2007) report on their findings in *PLoS One Biology* of three 'miniature' chameleons of the genus *Brookesia* namely – *Brookesia confidens* from Ankarna; *B. desparata* from Foret d'Ambre; *B. micra* from the islet Nosy Hara and *B. tristis* from Montagne des Francais. These lizards are amongst the smallest known living reptiles, indeed, the smallest of amniotic vertebrates on the planet. Mature adults of these species grow barely an inch in length.

These new lizards were discovered from the karst-dominated forests of northern Madagascar – an island well-known for its large radiation of peculiar flora and fauna – such as lemurs, fossa and scores of lesser life forms. Though located near the eastern coast of Africa, Madagascar has a very peculiar biogeography and

its affinities with the African mainland are largely limited to certain groups of wide-ranging species only.

The authors remark that these small-sized lizards are micro-endemic miniature forms that are found only on some very small, isolated islands and are, therefore, in need of urgent research and conservation attention.

The authors conclude by mentioning that these new dwarf or pygmy chameleons are model candidates to test hypotheses and draw correlations relating to geographical range, size and body size.

Next, a new species of skink *Lygosoma veunsainensis* was described by Geisler *et al.* (2012) in the journal *ZOOTAXA*. This new lizard was found in dense evergreen forests of Cambodia. The site where the new species was found, Veun Sai, is a proposed protected area and, the discovery of a new species greatly enhances the biodiversity of the area. The authors have named the species *veunsainensis* after the type locality, i.e., Veun Sai situated in the northeastern part of the country.

A new species of sea snake *Hydrophis donaldi* was described by Ukuwela *et al.* (2012), also in *ZOOTAXA*, from northern Australian coastal waters. To be exact, the location from where the type specimens were collected is the Gulf of Carpentaria. In this report, the authors remark that their finding of this distinctive species of sea snake from a region, heavily exploited by commercial fish trawlers, to be “highly surprising”. They attribute this plausibly to the fact that this species was collected not in the open sea but alongside the brackish water creeks and estuaries of the bay – a place not quite exploited by commercial fisheries and under-explored by scientists as well.

* * * *

Further studies on the Kerala mud snake (*Enhydris dussumierii*)

The Kerala mud snake (*Enhydris dussumierii*) has remained a little-known snake species endemic to Kerala. Recent studies on three individuals from Vellayani Lake by Biju Kumar and Ashok Captain gave some insights on the species' morphology, prey and geographic range (see *Cobra* V-(1). Now, another paper on the same species authored by S.R. Chandramouli *et al.* is out in the journal *Taprobanica* vol.4, issue 1. According to this paper, the species' description is “expanded” based on 10 individuals, nine live and one preserved, which the authors say is “nearly twice the number of documented specimens”. The paper also



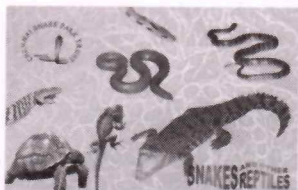
points out and corrects some long-forgotten and overlooked nomenclatural flaws and incorrect taxonomic authorships that have gone unnoticed.

The newly studied live snakes were those maintained in zoological parks. The localities Olathanni of Neyyatinkara and Sreekaryam and Akkulam on the outskirts of Thiruvananthapuram, from where these new snakes were procured add additional data to the known distribution of this species. The paper summarises the current knowledge on the morphology, natural history and geographic range of the species and concludes by recommending further fieldwork in the coastal plains of Kerala and also in the Kanyakumari district of Tamilnadu for fully documenting the distribution of this species.

—B. Vijayaraghavan

Our Publications

1. *Snakes and other Reptiles* (English and Tamil) (2000), by B. Vijayaraghavan
Size: 13.5 x 21.5 cm, pp. 22, Price: ₹ 20 (English) ; ₹ 10 (Tamil)
A useful compendium for beginners



2. *Snake Studies: India* (English) (2005), by B. Vijayaraghavan
Size: 16.5 x 24 cm, pp. 30, Price: ₹ 25
Containing a brief history of Indian ophiology and much else



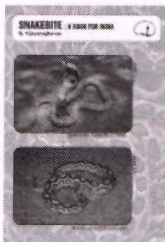
3. *Snakes in the Bible* (English) (2006), by B. Vijayaraghavan
Size: 16.5 x 24 cm, pp. 24, Price: ₹ 25



4. *Name - dropping — In Latin* (English) (2007), by B. Vijayaraghavan
Size: 17 x 24 cm, pp. 24, Price: ₹ 25
An inquiry into the scientific names of Indian snakes.

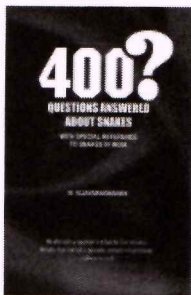


5. *Snakebite: A Book for India* (English) (2008), by B. Vijayaraghavan
Size: 16.5 x 24 cm, pp. 96, Price: ₹ 65

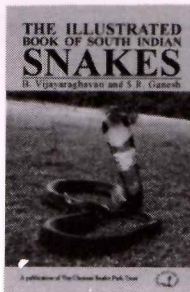


6. *400 Questions Answered about Snakes – with special reference to snakes in India* (English) (2010), by B. Vijayaraghavan
Size: 15.5 x 23 cm, pp. 232, Price: ₹ 120

All you wanted to know about snakes but didn't know whom to ask or where to search



7. *The Illustrated Book of South Indian Snakes* – (English) (2011),
by B. Vijayaraghavan and S.R. Ganesh
Size: 17.8 x 11.5 cm, pp. 96, Price: ₹ 65



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- iii) To aid and assist research on reptiles and amphibians including the conduct of surveys to assess their status and distribution.
- iv) To undertake captive breeding of endangered species of snakes and other reptiles.
- v) To canvass public support for the protection and conservation of reptiles and amphibians.

* * * * *

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