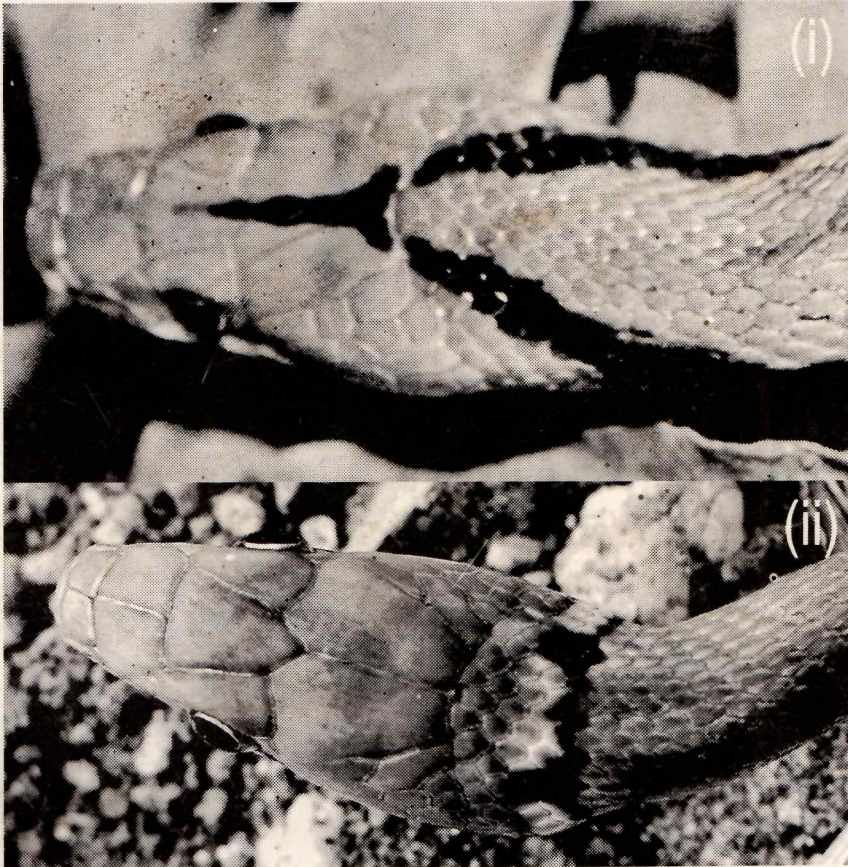


Cobra

Vol.-V Issue -2

July - December 2011



Half-yearly Journal
of the Chennai Snake Park Trust

Annual subscription : Individual – Rs. 75/-, Institution – Rs.150/-.

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Cover

Montane trinket snake (*Coelognathus helena monticollaris*):

Pictures showing two different head and neck markings –

- i. photo by Amol Kumbhar, from Satpura, Central India [see page 31 for details]
- ii. photo by S.R.Ganesh, from Cardamom hills, Southern Western Ghats

For a still different pattern, see photo by Ashok Captain, from Lonavla, Western Ghats, in Whitaker & Captain's *Snakes of India – the field guide*.

All these three had earlier (1996) been reported by Schulz in his *A monograph of the colubrid snakes of the genus Elaphe Fitzinger*.

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I only know thee humble bold,
Haughty with miseries untold,
And the old curse that left thee cold,
And drove thee ever to the sun
On blistering rock... Thou! whose fame
Searchest the grass with tongue of flame,
Making all creatures seem thy game
When the whole woods before thee run,
Asked but—when all is said and done—
To lie untrodden, in the sun.

— **Bret Harte**
(Crotalus)

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THE COPRA TRADE IN THE PHILIPPINES

SNAKE-LEGS IN INDIAN LORE

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Hanuman lands in Lanka. He is in search of Rama's consort Sita, incarcerated by the demon-king Ravana in the *asoka vana*, grove of *Saraca indica* trees. Hanuman is enraged to see the condition Sita is in and offers to carry her back, across the ocean, to Rama. Sita demurs and wants Rama himself to come to Lanka and rescue her. Hanuman agrees to go back and convey the message to Rama. But, before he departs, he wants to teach the demons a thing or two. He assumes a gigantic demon-form and proceeds to lay waste the beautiful forest, so dear to Ravana, and sow destruction all round. The terrified demonesses keeping guard over Sita, having seen the stranger speak to her, entreat her to tell them who this fearful apparition is. Sita feigns ignorance and, with assumed innocence, replies: "How should I know anything about these demons who change their form at will? You are the ones [yourselves being demons] who ought to know who he is and what he is going to do! Without a doubt, no one but a snake knows a snake's legs!" (That is, a snake's legs are visible only to another snake). This is how many authors have translated Valmiki's line in Sanskrit: "*ahir eva aheh pādān vijānāti*" (*Valmiki Ramayana, Sundarakanda Ch.40, verse 9*).

It was an ancient belief in India that the snake has legs but these are hidden from human sight; only another snake could see them. That was why the snake was called in Sanskrit *goodapādah* meaning "one with hidden legs". Goldman and Goldman in their English translation of Valmiki's work say that Sita was "*evidently citing a proverb*" (emphasis added). In other words, this was not a product of Valmiki's poetic imagination.

It must be remembered here that though, in this paper, for the sake of convenience, the original text of *Ramayana* has been attributed to Valmiki, historical

evidence, such as it is, and literary evidence suggest that the text that was essentially composed by Valmiki around 400 B.C., based on stories orally transmitted by reciters and itinerant bards over many decades, had undergone constant revisions atleast upto 200 B.C. (Keith, 1928). The verse examined here could thus well have been a later embellishment to Valmiki's text based on a proverb in vogue somewhere or the other in the country picked up by a later reciter or bard, we do not know for sure. In fact, Winternitz (1907) says that even before the oral tradition was converted by Valmiki into a written text, the reciters often "added new moral verses [and interpolated] moral sayings that they had taken from somewhere".

Coming back to the verse, snakes, of course, do not have legs. The ancestors of present-day snakes did have legs, but these were lost in the course of evolution, during many millions of years, to facilitate their creeping, burrow-dwelling, life style. Some primitive species like the pythons—not all pythons but some (including the two found in India) — have even now vestigial remnants of hind legs in the form of two short 'spurs' on their underside which are not visible when the snake is in the normal position, but these are of no use in locomotion.

Our ancients seem to have had an ingenious way of explaining the mysterious capabilities of the snake. How could the snake hear (some) sounds when it had no earholes?⁽¹⁾ The snake, it was assumed by them, could hear with its eyes and, hence, they called it *Chakshusravanah*, Sanskrit for 'that which hears with its eyes'! Also, *gokarnah*, 'one whose eyes and ears are the same'! (Fanciful, but, coming to think of it, not quite absurd considering that the snake 'smells' with its tongue⁽²⁾!). How could the snake survive for long without eating and why does it so often flick its tongue in the empty air? Because it feeds on air, so they assumed. Hence *Vayubukh* or *Vathāsanah* 'that which eats air'! Similarly, the snake appeared to move without legs only because the legs are invisible to us. Hence, they called the snake *goodapādah*.

-
1. Snakes, though lacking ear holes, the tympanic cavity and the tympanum, possess parts of the middle ear and the inner ear. They can hear airborne vibrations in the low-frequency range of 200 to 500 hz. which hit the sides of the skull and are transmitted to the middle ear and the inner ear. This is in addition to their hearing (not merely sensing) ground-borne vibrations transmitted to the middle ear and the inner ear.
 2. Though the snake has nostrils and the olfactory system as in many animals, they play only a minor role in smelling. It is the vomero-nasal system that has a major role. The flicking tongue collects scent particles from the ground or water or other substrate or the air and when it is withdrawn into the mouth it deposits these particles on a structure in the roof of the mouth known as 'Jacobson's organ' where the particles are analysed and the smell is interpreted.
-

But, was Sita alluding to the snake's legs at all? Apart from its obvious meaning, 'legs' or 'feet', the Sanskrit word *pāda*, used by Valmiki, has two other meanings too. It could mean 'way' or 'path', in which case the line could mean that a snake alone can see and follow the trail left by another snake. This conforms to a not-uncommon observation, that, sometimes, when a snake is killed, soon after, another such snake would be seen at the site and this has given rise to the belief that the snake has come in search of the killer, to seek revenge. This is a superstition since snakes are not capable of such feelings as revenge, but there is some basis for the rest of the belief. The snake has scent glands near its vent, and these exude a secretion containing pheromones or scent particles, particularly when the snake is agitated or when it is attacked or when it wants to give a lead to a member of the opposite sex during the breeding season. The trail is invisible to human eyes but can be smelled by another snake of the same species and, perhaps, other species as well. Hence, "a snake's trail only a snake knows"!.

Then again, the Sanskrit word '*pāda*' in the context could also mean the way (of a snake), that is, its behaviour, much in the manner the word is used in the Bible (Proverbs 30: 18-19): "the way of a serpent upon a rock" which the author of the Proverb found to be "too wonderful" for him. Snakes have always been a mystery to us, humans, in many respects but, obviously, are familiar with each other's style and conduct. The figurative extrapolation is that only persons of similar disposition will know each other's traits.

Interpreted in whichever manner, Sita is telling the demonesses that the super-natural monkey being obviously some kind of demon, as shown by his terrifying form and behaviour, they, the demonesses (and others of that ilk), alone should be in a position to know who, in fact, he is and what he is up to; who is she, a mere mortal, to know the truth about him?

The Ramayana, as is well known, has been translated into many languages, Indian and foreign, and it needs to be examined how Valmiki's line has been dealt with by others. Of course, very few of these translations claim to be complete or faithful to the original. Many of them are redactions, regional recensions and subrecensions, often with portions excised or altered and much extraneous matter thrown in – even "bizarre retellings, traditionalist apologia and wishful fantasies" (Goldman and Goldman). The most noteworthy successors to Valmiki's original text were, in the next generation, *Adhyatma Ramayana*, *Vasishta Ramayana*, *Ananda Ramayana* and *Agastya Ramayana*, all in Sanskrit, and, in the subsequent

generation, *Kamba Ramayanam* in Tamil, *Tulasidas Ramayana* in Hindi, *Kirtivasa Ramayana* in Bengali and *Adhyatma Ramayanam* in Malayalam.

Goldman and Goldman translate Valmiki's line thus: "without a doubt, no one but a snake knows how a snake walks". Having said so, they, in their commentary on the line, say as follows: "Sita is evidently citing a proverb, something like the English, 'it takes a thief to catch a thief'. Commentators do not elucidate the precise meaning; indeed only [Bansidhara's commentary] *Siromani* appears to take any notice of the proverb, merely remarking that it is an illustration. N. Raghunathan translates the line as "the snake alone knows how many feet he has". M.N. Dutt translates it as "serpents... know the way of serpents". The Gita Press's edition of the translation is "Indeed a serpent alone has a true knowledge about the movements of a serpent".

The Right Hon. V.S. Srinivasa Sastri, after translating the line as "only a cobra (sic) knows the ways of other cobras (sic)" adds in parenthesis: "it was a well-known proverb apparently".

In D.S. Sarma's English translation of *Ramayana*, the line runs, "it is only serpents that can know serpents' ways".

Kamala Subramaniam in her *Ramayana* in English gives the line as "only a snake will know about the passage of another snake".

Arshia Sattar, in her translation of the *Ramayana* into English, has the line as "a snake knows another snake's tracks".

Coming to compositions in Indian languages, the two most widely known ones are Goswami Tulasidas's work in Hindi entitled *Ramacharitamanasa*, (14th – 15th century A.D.), popular in North India, and the Tamil poet Kamban's work, well-known in the South and called *Kamba Ramayanam* (12th-13th century A.D.). While Tulasidas leaves out the entire dialogue between the demonesses and Sita (the demonesses asking Sita about Hanuman and Sita's reply), Kamban recounts the dialogue, and even though Sita explains her helplessness to understand the doings of demons, curiously leaves out the telling metaphor of snake-legs (or snake-trails or snake-traits) employed by Valmiki. Tulasidas leaving out the dialogue is understandable since he had depended not on Valmiki's *Ramayana* but on *Adhyatma Ramayana* whose authorship is ascribed to Vedavyāsa who also composed the *Mahabharatha*. But, why Kamban, who had based his work on Valmiki *Ramayana*, makes this omission is not clear at all, particularly if the metaphor was familiar to



the people as seems to have been the case (see also Srinivasa Sastri *supra*). And this, in spite of Kamban's Sita being less cryptic in this episode than Valmiki's Sita, recounting how she fell for the trickery of another demon, Mārīcha, who came in the guise of a golden deer, something not found in Valmiki.

In Rajaji's (C.Rajagopalachari) popular retelling of Ramayana in Tamil (1973), originally published under the title *Chakravarthi Thirumagan*, the dialogue between the demonesses and Sita finds mention as in Valmiki but not the particular line under reference. This again is surprising considering that Rajaji was well-versed in Tamil and should have been very familiar with the Tamil proverb.

I have had some doubt on whether this proverb was inspired by Sita's words as quoted by Valmiki but this does not appear to be so when Kamban had omitted this line and no such line is known to appear in any Tamil translation or retelling of Valmiki's work. K. Diraviam's four-volume Tamil compilation of thoughts, *Chinthanai Churangam*, gives this as a proverb but does not elucidate its origin. The proverb, most probably, had an independent existence in the South and, presumably, in the North also, which had been relied on by Valmiki or by a later embellisher. It was not the other way around. This proverb, however, does not find mention in a most comprehensive anthology of 3644 Tamil proverbs collected by Rev. Herman Jensen in 1897.

There is a most noteworthy aspect to the Tamil proverb. The word *Kāl* in it is remarkably similar to *pāda* in Sanskrit in that it too is capable of being interpreted in different senses relevant to the context just as the Sanskrit word. It provides us with an interesting case of linguistic convergence. The obvious meaning of the word *Kāl* is, of course, 'leg'. But, as the Tamil Lexicon of the University of Madras says, *Kāl* also means "way, road, path" (The Tamil word, though, does not seem to have the third meaning of the Sanskrit equivalent: 'manner or habit').

A translator like Swami Tapasyananda found the literal meaning of Valmiki's line so baffling that he has taken the liberty of substituting it with his own metaphor: "It is the business of a thief to watch and find out the route of the traveller correctly". Which in no way is an improvement over the original.

In Vallathol Narayana Menon's Malayalam translation of Valmiki Ramayana, the line reads thus: '*pāmbé sarikkariyukayullu pāmbinté kālkalé*, meaning 'the snake alone truly knows the snake's legs'. *Kāl* in Malayalam does not have the multiple meanings as in Tamil. Further, by using the plural *kālkal*, the poet puts the



meaning, as he sees it, beyond doubt since the plural in particular can mean only 'legs'.

There is a comprehensive Malayalam translation of Valmiki's work by Swami Sundaresan in which the line appears as *Sarpathinnu māthramé sarpathinté vazhikalé kurichariyukayullu* (The snake alone knows the snake's ways) – where the word *vazhikal* could be interpreted to mean either trails or traits but not legs.

The best-known Ramayana in Malayalam is by the poet Thunchath Ezhuthachchan: *Adhyatma Ramayanam* (16th century). This is a translation not of Valmiki's work but of *Adhyatma Ramayana* by Vedavyasa in Sanskrit. It is, therefore, no surprise that the dialogue between the demonesses and Sita finds no mention here.

In Malayalam also, the usage *Pambariyum Pambin kāl* occurs. But it is not known whether this is indigenous to Malayalam or an adoption of the Tamil saying since all the three (four) words are the same in both Malayalam and Tamil. The usage *Pampariyum pambinté kāl* is, however, listed by T. Ramalingam Pillay in his classic work, *Malayala Sailee Nighandu (Dictionary of Malayalam Phrases and Idioms)* published in 1937, but no information is given as to its origin. (The author, by the way, was, by birth, a Tamilian and had also written books in Tamil in addition to books in Malayalam). Probably following Ramalingam Pillay, *Pambariyum pambinté kāl* is also mentioned by N.B. Nayar in his *Malayalam Thesaurus* (2003). The literal meaning is not given, but, as regards its figurative meaning, both Ramalingam Pillay and N.B. Nayar give a twist: "One's secrets are known only to oneself". This will not fit into the context in *Valmiki Ramayana*, but, then, they make no claim that the proverb has anything to do with the epic. P.C. Kartha, in his *Pazhanchol Prapancham* (Universe of proverbs) (1966), a collection of 9948 Malayalam proverbs, lists *pambinté kālū pāmbé ariyu*. He too does not give the literal meaning but the figurative meaning is given as 'only the evil person knows the ways of another such'.

It will be interesting to find out how Valmiki's line has been dealt with in other Indian languages where there is a translation of the original work either word for word or as a redaction and also whether there exists in these languages a proverb which has the same meaning, single or multiple, and how that proverb had its origin.

(A Bengali friend, while telling me that the passage does not find mention in the well-known Bengali redaction of Valmiki's work, the *Krittivasa Ramayana* by poet Krittivasa Ojha (15th century), adds that there is a proverb in Bengali with a somewhat similar meaning: *Samperai chene samper hanchi*: "Only a snake recognizes a snake's sneeze"!)

Before I part with this subject, let me point out that our ancients were not altogether wrong when they thought that the snake moved on hidden legs. Not though in the manner they thought or to the extent they thought. The snake generally has some 120 to 240 vertebrae (in some, many more), and such of these as are in the region of the neck and the trunk have a pair of ribs attached, one on either side. While this arrangement is not basically different from that of most other vertebrates, what is special about the snake is that the ribs are very long and movable, curved backwards, and are attached to a series of elastic muscles and tendons arranged diagonally along each side of its body. These are connected to the strong, horny scales on the belly (Romer, 1956; Goin & Goin, 1962).

There has been much debate among herpetologists for long about the precise role played by the ribs in the locomotion of snakes. Had the view held at one time that the snake moves with the aid of its ribs been continued to be accepted even now by scientists at large, the ancient Indian belief that the snake walks on "hidden legs" could, perhaps, have been sustained in a figurative sense. However, this is not quite so and the subject is, even to this day, ridden by controversy. By and large, the present understanding of the subject, so far as it is relevant to this paper, may be summarized as follows in the simplest terms:

There are four types of terrestrial progression in snakes: lateral undulation, concertina movement, side-winding and rectilinear progression. Though particular species of snakes generally adopt any one of these modes, they are also likely to switch the mode occasionally depending on the substrate. In the first three types, the ribs do not appear to have a role, as concluded by Bogert (1947). Subsequently, however, Romer (1956) has held that the ribs are "important elements in the undulatory locomotion of snakes, through their connection with the strong horny scales of the belly." In any case, in the fourth type of locomotion, namely, rectilinear, it was once thought that the ribs and the ventral scales played an active role. The "rib-walking theory", as it was called, is not much in favour now since the view is that there is no direct involvement of the ribs and the ribs remain stationery with reference to the vertebrae (Bogert, 1947). But the muscles controlling the

successive waves in the ventral scutes are attached to the ribs (Porter, 1972) and, to that extent, the ribs have a role in the movement of the muscles causing the rectilinear locomotion of the snake.

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Snake Occurrence in Kanchipuram District, Tamil Nadu, India

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Introduction

In a predominantly agricultural country like India, with a rich snake fauna, encounter between man and snake is a frequent occurrence. Worldwide, perhaps, 30,000 to 40,000 people die from snakebites every year. A total of 25% of these casualties is recorded from India (Swaroop & Grab, 1954; Sawai & Homma, 1976). About 2,00,000 persons get bitten by snakes every year in India of which about 15,000 die (Chippaux, 2006). However, in subsequent studies, estimated death due to snakebite in India figured as high as nearly 46,000 (Mohapatra *et al.*, 2011).

In particular, four species are responsible for most of the serious bites in India (Whitaker & Andrews, 1995) and these are the common cobra *Naja naja*, the common krait *Bungarus caeruleus*, the Russell's viper *Daboia russelii* and the saw-scaled viper *Echis carinatus*. These four venomous snake species are collectively mentioned as "the Big Four" (after Whitaker, 1978) and they play important roles in Indian medicine as their venom serves to produce the only life-saving drug for snakebite i.e., polyvalent anti snake venom serum (ASVS). India needs venom centers to support enough stock of medicines readily available to cure snakebite victims. At present, the only example for a successfully running venom centre in India is the Irula Snake Catcher's Industrial Co-operative Society (ISCICS) at Vadanemmeli village in Kanchipuram district, Tamil Nadu.

ISCICS, the only remarkable example to make sustainable use of a wild animal product in India, plays dual roles not only by providing better livelihood to 350 Irula tribal members but also by maintaining the ecological balance in its operational areas. Members of the Society capture adult snakes (> 100 cm for Common Cobra and Russell's Viper and > 90 cm for Common Krait) of the "Big Four" category from non-forest lands in Kanchipuram district of Tamil Nadu. After extraction, the same snakes get translocated to the wild under the supervision of the Forest Department. Each individual of the three larger snake species gets a unique registration number at the Society as they get marked by the ventral scale clipping method after venom-extractions to reduce their immediate recapture after release.

The Irulas are globally known for their legendary knowledge about the natural history and ecology of snakes in particular. Their expertise in finding these elusive animals in the wild stems from generations of acquaintance with snakes. Their search for the "Big Four" varies with season, time of the day, habitat and micro-habitat. Irula's routine activities will give ideas about the snake population in their operational areas and also the snakes' response to the ever-changing landscapes. Their routine search for snakes can provide excellent data on the spatio-temporal distribution, abundance, density and prey preference. Systematic data collection will elucidate the dynamics of snake population in a particular area over time.

Romulus Whitaker, the technical advisor of ISCICS, accompanied some of the Irula members in their regular snake surveys for a six-day period in the year 2002 (Whitaker & Lenin, 2008). He and his team recorded a total of 49 snakes including 19 venomous during his trip in 2002 (Table 1). After a gap of seven years, in 2009, a snake survey was carried out in similar sites by the same members as of the 2002 trip, so as to document the population dynamics of snakes between this time span. The study reveals many important aspects on the ecology of the three common venomous snake species i.e., Common Cobra, Common Krait and Russell's Viper which are often sympatric in distribution and available in human altered habitats. This study opens a path to continue a prolonged scientific research on the population ecology of snakes in agricultural landscape in India which is of great importance (Whitaker, 1984; Whitaker and Lenin, 2008).

Table 1: Total snakes and shed skins found by Irulas from 19/07/2002-26/07/2002

Date	Site	Hrs	CC	CK	RV	Other	Sheds
19/7/02	Manamadhi	4	2			3	30
21/7/02	Karumbakkam	7	3			3	21
23/7/02	Mambakkam	5	1	1	1	4	34
24/7/02	Polacheri	5.5	1			7	31
25/7/02	Kolathur	7.5	1		8	8	27
26/7/02	Anandapuram	4	2			4	14
Total		33	10	1	9	29	157

Study area and methods

Irula members of the ISCICS went for their regular snake survey at Manamadhi (12.656°N; 80.113°E), Karumbakkam (12.701°N; 80.088°E), Mambakkam (12.842°N; 80.174°E), Polacheri (12.845°N; 80.187°E), Kolathur (12.807°N; 80.159°E) and Anandapuram (12.643°N; 80.128°E) in Kanchipuram Dist., northeastern Tamil Nadu on 19th, 21st, 23rd, 24th, 25th and 26th July (Table 2). They were accompanied by me during the period of this six days and the data collected during survey are analyzed in the present report.

The surveys were confined to paddy fields and adjoining fallow lands. The paddy crops were about a meter high at most places, with their panicles just formed or matured. One of the survey-sites, Kolathur had a mosaic of panicle-formed paddy and harvested crops. Other sites Manamadhi, Karumbakkam, Polacheri and Kolathur showed similar habitats with greater areas under paddy cultivation than fallow lands. The micro-habitats searched for snakes were low embankments at fallow field edges and cultivated lands; high embankments at field edges with heavy underbrush as well as well-tailing termite mounds. Karumbakkam has sparse sesame cultivation besides paddy and Kolathur had casuarinas too.

Surveys were conducted in the morning between 06:35 and 08:00 hours, as early sunshine is often preferred for basking by Russell's viper and common cobra (pers. obs.). Snakes were tracked after shed skins or sloughs, faecal matters and body impressions at burrow entrances. We searched Russell's vipers under vegetation, leaf litters and inside *Ipomoea* plant thickets. Saw-scaled viper was not searched for due to unfavorable weather and also because its search areas will not incorporate the microhabitats of the other three (targeted) species. A two or

three-member group searched thoroughly around the microhabitats looking for presence or secondary evidences of snakes. The scats, skeletal remains of dead snakes, hatched egg-shells were collected and brought to the ISCICS for precise identification. Fur samples from the regurgitated rodent preys were collected and a few sloughs were also collected as samples. When a snake was present, microhabitat details and ambient air temperature and humidity were recorded. Burrows were dug with utmost care to ensure safety of the snake or egg clutch if present inside. Egg clutches were collected and brought to the ISCICS for ex-situ incubation since the oviposition-site was dislodged for getting the snake. Every snake was measured for length to check if the snake qualifies for the criterion laid down by the ISCICS for purchasing it. Those that don't fulfil, was scale-clipped (to avoid recapturing and re-measuring) and released immediately. The presence (direct and indirect) of other snake species encountered during the surveys was also recorded. A transect of not more than 2 km was thoroughly searched for snakes. Snake searches lasted for a maximum of 6 hours i.e., 12 to 18 man-hours / day.

Results

A total of 18 venomous snakes including 8 common cobras, 4 common kraits and 6 Russell's vipers were recorded during the 6 days period (Table 2). Every snake of these three species was measured and categorized under different size-classes to infer their life stages. These life stages were categorized as juvenile, sub-adult, adult male and adult female (Table 3). One adult female common cobra caught from Manamadhi on 19/07/09 was 'xanthic' (i.e, a hypo-pigmented form having pale yellow body with light spectacle mark and reddish eyes; see Table 4). The maximum number of snakes caught were adults (male 7; female 9). One adult Russell's viper was found but escaped before capture. So it's sex could not be determined. The maximum number of cobras were females (6) and all were found with egg-clutches (Table 3, Table 4). In one case at Kolathur, a freshly hatched egg-clutch was found after digging but the mother snake could not be traced even after an elaborate digging for almost 1.5 hours (Table 5). All cobras were purchased by the ISCICS and the eggs were kept under incubation there (Table 2, Table 4). Some of the eggs were found to be infertile while collecting from the field and a single egg of this abandoned clutch was found predated by rodents (Table 4). Three adult males and one adult female Russell's vipers were recorded (Table 3). The female was gravid and after a week in the ISCICS, gave birth to 12 live young on the 31st (Table 4). Four common kraits were captured among which 2 each were adult males and females (Table 3). Only one among these was brought to the ISCICS as

it was a 107 cm long adult male (Table 4) and the rest were not long enough to be accepted by the ISCICS (2 females each 75 cm and the male 85 cm). All these three snakes were captured from Polacheri on 24/07/09 and were released immediately after checking their lengths. The first captured krait was an adult female found in association with an adult male in the same microhabitat (Table 6). While the two Irula members were searching for snakes in Anandapuram, they encountered three other members there, also for the same purpose. They revealed that they found 3 Common Kraits from Anandapuram but released 2 of them, as those were less than 90 cm length. Their only adult krait was a male longer than 100 cm. One male cobra and the male krait caught from Mambakkam regurgitated their prey (rodents) after capture. Fur samples of these two prey items were collected and brought to the ISCICS as samples of the prey base of the target snake species.

A total of 186 (CC 144, CK 33, RV 9) secondary evidences including sloughs, scats, egg-shell remains and freshly hatched egg clutch were found, showing the presence of the concerned snake species (Table 5) at the localities. From the sloughs, the life stages of the snakes were grossly inferred (as the sloughs get slightly expanded while shedding). We found 119 adult cobra sloughs, 23 adult krait sloughs and 7 adult Russell's viper sloughs. Presence of one adult female cobra was assumed after getting a freshly hatched egg-clutch in Kolathur and the egg-shell remains of an old clutch in Anandapuram. Four egg-shells of the previous year were found intact inside a burrow in Karumbakkam and thus showed indirect evidence of four juvenile common kraits there last year. A total of 27 scat samples were recorded from different sites among which 22 samples were recorded as cobra scats, 3 samples as common krait scats and 2 as Russell's viper scats.

Both the elapid species i.e., the cobra and the krait showed a similar pattern in microhabitat preference during the present survey (Table 7). Most cobras (7/8) were found in rodent burrows (of the field rat *Bandicota bengalensis*). Only one male cobra was found basking inside the hole of a dead palm tree lying over a high embankment with trees and heavy underbrush at fallow field edge at Mambakkam (Table 6). One common krait was found inside rodent-burrow (of the field mouse *Mus booduga* according to the Irulas) and the same one regurgitated its feed later which was most probably a *Mus* sp. A krait was found inside an ant-hole down to a Palm tree at low embankment at fallow field edge at Polacheri. One pair of Kraits were found from inside rock piles at a well-tailing at paddy field in Polacheri (Table 7). *Ipomoea* thicket proved to be very good micro-habitat for Russell's Viper as half (3/6) of them were found under the entangled *Ipomoea* stems at Mambakkam.

High embankments with trees and heavy underbrush at the field edges are also good micro-habitat for this species as 1 snake was found under leaf litter at Mambakkam. The gravid female Russell's viper captured from Mambakkam was found under *Ipomoea* stem tangle at 13:10 hours when the microhabitat temperature was quite high and same as the atmospheric temperature (41°C). The percentage of humidity was also remarkably less at the microhabitat (23%), just one percentage more than that of the Atmosphere (22%) (Table 6, Table 7).

A total of 49 non-venomous snakes of 7 species were sighted (Table 3; Appendix 1). The most abundant among them was the Indian Rat snake *Ptyas mucosa* (n = 24) followed by Chekered keelback *Xenochrophis piscator*, (n = 9) common bronzeback tree snake *Dendrelaphis tristis* (n = 7), striped keelback *Amphiesma stolata* (n = 4), the common wolf snake *Lycodon aulicus* (n = 1) and Russell's kulkri snake *Oligodon taeniolatus* (n = 1) (Table 8). One carcass of an Indian rat snake was found from Anandapuram and one carcass of a striped keelback was found from Karumbakkam. Both the snakes were suspected to be deliberately killed by the local villagers. A total of 246 secondary evidences including sloughs, scats and egg-shells of non-venomous snakes were found from all the localities (Table 9). Sloughs of the Indian rat snakes were dominant (n = 176) following striped keelback (n = 21), common bronzeback tree snake (n = 19), common wolf snake (n = 6), common vine snake (n = 6) and Russell's kukri snake (n = 1). The only non-venomous snake species, inferred from faecal matters (n = 10) was the Indian rat snake. Presence of 4 egg-shells, hatched few months ago, from inside a burrow, proved the presence of an adult female and four juvenile Indian rat snakes at Polacheri.

All the non-venomous snakes were opportunistically recorded whenever sighted while searching the targeted venomous snake species. The rat snakes were found from different microhabitats often showing resemblance with common cobra. All the 23 snakes were healthy adults.

Discussion

The searching methods of Irulas proved to be appropriate for finding an elusive animal like snake in the wild. Secondary evidences helped a lot to sight the target species. The faecal matters were also recorded after the confirmation by the Irulas as those often helped to find out the concerned snake species.

Common cobra was the most abundant venomous snake (8/14) (Table 5). A good number of egg-clutches found from Manamadhi, Kolathur and Anandapuram



also showed the signs of healthy reproducing population of cobras. Surprisingly male and breeding female snakes were never found in close proximity whereas two female cobras (both with egg clutches) were found within a distance of 40 meters (see time of catch for the two female cobras at Manamadhi; Table 6). Further research on the home range of this species will be extremely interesting to know if the females really maintain their territory while incubating and keep away the adult males. Absence of the mother with the last clutch found at Polacheri proved the fact that female cobras moved out from their dens even when incubating the eggs and not always remained with its egg-clutch. The absence of the mother cannot be attributed to its thirst to drink water (as incubating female cobras are never recorded to eat anything) because the distance of water was hardly a meter from the burrow where the clutch was found.

In all other instances the female was found behind the egg clutch and was often aggressive, which is typical character of any breeding animal along with eggs or babies.

From the microhabitat preference of the Cobra, it was clear that the species was a hole-dweller and highly adapted to stay in close association with human settlements (Table 6). All but one individual ($n=7$) were captured from burrows of Field Rats *Bandicota bengalensis* and thus this rodent species should be reckoned as the most preferred prey species for Common Cobra. The regurgitated rodent from a freshly captured Cobra was also a *Bandicota bengalensis* which again confirmed our microhabitat observations. However Common Cobra should be inferred as a habitat-generalist as it was found (direct and indirect evidence) in a wide range of micro-habitats in every locality searched (Table 6). The beneficial role of this species as a rodent pest-controller is also clearly proved. Basking activity of a single individual at Mambakkam proved the crepuscular nature of this species.

Common Krait was a hole-dweller often found in the same micro-habitats as the Cobra (Table 6). A Krait captured from a mouse-hole at Mambakkam regurgitated a *Mus sp*. One krait was captured inside ant-hole at Polacheri and the other two catches from the same locality were at a well-tailing. A pair was found in the same rock pile. This accompaniment pattern was quite surprising as the breeding season for Krait in this part of India was already over! Even though this species was strictly nocturnal, the skill of the Irulas could find it out from inside the dens during day hours also.

Table 2: The six days operation (19/07/09-26/07/09) done by the ISCICS members

Date	Irula members In operation	Locality	GPS co-ordinates	search period man- hours	Venomous snakes seen			Other- snakes seen	sloughs	Snakes purchased by ISCICS
					CC	CK	RV			
19/7	C. Kali; T. Gopal	Manamadhi	12.656°N; 80.113°E	12	3	0	0	5	34	CC3
21/7	T. Poongavanam, M. Kuppan	Karumbakkam	12.701°N; 80.088°E	10	0	0	1	5	50	RV1
23/7	M. Kuppan, M. Seenu	Mambakkam	12.842°N; 80.174°E	12	2	1	4	3	66	CC2; CK1RV3
24/7	M. Kuppan, M. Seenu, T. Poongavanam	Polacheri	12.845°N; 80.187°E	18	0	3	0	9	55	Nil
25/7	C. Kali; M. Seenu, M. anageshwaran	Kolathur	12.807°N; 80.159°E	18	2	0	1	15	61	CC2
26/7	C. Kali; T. Gopal	Anandapuram	12.643°N; 80.128°E	12	1	0	0	12	105	CC1
	Total			82	8	4	6	49	371	CC8; CK1RV4

Russell's viper is often a habitat as well as microhabitat-specific species and hence the micro-habitats targeted and the method adopted to search this species were very different from those for the other two elapid species (Table 7). All the adult Vipers were found underneath vegetation cover (Table 6) whereas the single sub-adult at Kolathur was found lying above leaf-litter. *Ipomoea* thickets were proved to be very good micro-habitats for this species as 4 out of 6 individuals were spotted there. The species was well camouflaged at all microhabitats. The snakes were found to prefer higher humidity level at their retreat sites (Table 6). The single gravid female was found at a considerably low humidity level of 23%. It was not very clear if that particular climatic condition was favoring it while carrying. This female gave birth to 12 babies at the ISCICS after 8 days of capture. All the babies except one were healthy.

Table 3: All the venomous snake species observed under different life-stages

Locality	Life stages observed					Total
	Juvenile	Sub-adult	Adult male	Adult female	Adult unidentified	
Manamadhi				CC3		CC3
Karumbakkam			RV1			RV1
Mambakkam			CC2; CK1; RV2	RV1	RV1	CC2; CK1; RV4
Polacheri			CK1	CK2		CK3
Kolathur		RV1		CC2		CC2; RV1
Anandapuram				CC1		CC1
Total		RV1	CC2; CK2; RV3	CC6; CK2; RV1	RV1	CC8; CK4; RV6

Table 4: The details of the venomous snakes found

ISCICS Regn. No	ISCICS purchase date	Sex	lnth(cm)	wt(gm)	breeding status	Total clutch size	infertile eggs	eggs under incubation at ISCICS	babies born at ISCICS	date of birth
C92	21/07/09	F	157	815	with clutch	15	0	15		
C93	21/07/09	F(xanthic)	143	632	with clutch	21	9	12		
C95	21/07/09	F	130	307	with clutch	20	1	19		
C96	23/07/09	M	152	576						
C97	23/07/09	M	124	342						
C98	26/07/09	F	138	551	with clutch	22	2	20		
C99	26/07/09	F	147	541	with clutch	13	0	13		
C100	26/07/09	F	132	318	with clutch	12	0	12		
						21*	1	20*		
RV101	23/07/09	M								
RV102	23/07/09	m	107	632						
RV103	23/07/09	m	121	876						
RV104	23/07/09	f	114	713	gravid				12	31/07/09
CK66	26/07/09	m	107	167						

* This clutch of Cobra eggs was found from Kolathur but the mother snake could not be traced even after a search effort of 4.5 man hours! Only one egg in the clutch was found infertile / predated by rodent. The rest of the clutch i.e., 20 eggs were brought to the ISCICS and incubated under proper care.

Table 5: Secondary evidences showing the presence of venomous snakes at different localities

Locality	Secondary evidences for venomous snake species							Total
	sloughs			Scats	freshly hatched egg-clutch	hatched egg-shells	Egg-shell remains of a single clutch	
	adult	sub-adult	juvenile					
Manamadhi	CC23;CK2			CC4;CK1				CC27;CK3
Karumbakkam	CC16;CK3	CC1;CK1		CC5;RV1		CK6		CC22;CK10;RV1
Mambakkam	CC23;CK5;RV4			CC6;CK1				CC29;CK6;RV4
Polacheri	CC15;CK8;RV1			CC6;RV1				CC21;CK8;RV2
Kolathur	CC17;CK2;RV1			CK1	CC1			CC18;CK3;RV1
Anandapuram	CC25;CK3;RV1			CC1			CC1	CC27;CK3;RV1
Total	CC119;CK23;RV7	CC1;CK1		CC22;CK3;RV2	CC1	CK6	CC1	CC144;CK33;RV9

Table 6: The sighting times and the microhabitat details of the venomous snakes

Snake sp	Sighting time(hrs)	Mhab	Mhab ht(m)	Mhab hum(%)	Mhab temp(°c)	Dist. of water from mhab(m)	Disturbance near mhab
CC	13:15	Rodent burrow	0.5	42	38	2	Nil
CC	13:40	Rodent burrow	1	39	37	10	workers at field
CC	15:15	Rodent burrow	2	42	37	3	workers at field
CC	07:25	Inside dead palm tree trunk	1	57	32	10	Nil
CC	12:05	Rodent burrow	1	44	37	2	Nil
CC	07:45	Rodent burrow	1.5	53	34	10	Nil
CC	11:10	Rodent burrow	1.5	35	40	25	Nil
CC	10:00	Rodent burrow	3	43	39	5	Earth collector working
CK	11:55	Rodent burrow	1	46	36	2	Nil
CK	10:20	Inside rock piles	2.5	35	36	2	Nil
CK	10:23	Inside rock piles	2.5	35	36	2	Nil
CK	14:25	Ant hole	0	43	38	10	Nil
RV	10:35	Under vegetation cover	1	51	38	3	Nil
RV	07:45	Under leaf litter	1	59	32	10	Nil
RV	08:30	Inside entangled Ipomoea stems	0	48	38	20	Nil
RV	08:45	Inside entangled Ipomoea stems	0	48	36	50	Nil
RV	13:10	Inside entangled Ipomoea stems	0.5	23	41	12	cattle grazing
RV	08:00	Above leaf litter	3	52	33	11	Nil

Table 7: Details of the habitats, sub-habitats and microhabitats of the venomous snakes

Sub-habitats at the mosaic habitats of fallow and cultivation (dominant rice paddy and somewhere sesame), Casuarina plantation, dry drainage ditch	Microhabitats								
	rodent burrow	ant-hole	under entangled ipomoea stems	inside rock piles	under vegetation cover	under leaf litter	inside dead palm tree trunk	Above leaf litter	Total
high embankment at field edge with trees and heavy undergrowth	CC1					RV1	CC1	RV1	CC2;RV2
low embankment with hedge-rows separating crop field and fallow	CK1								CK1
low embankment with hedge-rows separating crop fields	CC2								CC2
low embankment with thick vegetation separating crop fields					RV1				RV1
low embankment with hedge-rows at fallow field edge	CC1	CK1							CC1;CK1
low embankment separating fallow and dry drainage ditch	CC1								CC1
well-tailing mound with grass cover and mixed scrub	CC1			CK2					CC1;CK2
well-tailing mound with Prosopis									CC1
Ipomoea thicket at lowlands			RV3						RV3
Total	CC7; CK1		RV3	CK2	RV1	RV1	CC1	RV1	CC8;CK4; RV6

Table 8: Locality wise availability of the non-venomous snakes

Locality	Non-venomous snake species observed		Total
	Live	Carcass	
Manamadhi	IRS2;CBTS2;CWS1;SK1		IRS 2;CBTS 2;CWS 1;SK1
Karumbakkam	IRS4;SK1	SK1	IRS4;SK 2
Mambakkam	IRS1;CBTS2		IRS 1;CBTS 2
Polacheri	IRS6;CBTS1;CVS1;CKB1		IRS 6;CBTS 1; CVS1;CKB1;
Kolathur	IRS7;SK1;CKB 5		IRS 7;SK1;CKB5
Anandapuram	IRS3;CBTS2;SK1; CVS1;CKB 3;RKS1	IRS1	IRS 4;CBTS 2;SK 1;CVS 1;CKB 3; RKS 1
Total	IRS 23;CBTS7;CWS1; SK3;CVS2;CKB9;RKS1	IRS1;SK1	IRS 24;CBTS 7;CWS 1; SK 4;CVS 2; CKB 9;RKS 1

Table 9: Secondary evidences proving the presence of non-venomous snakes

Locality	Secondary evidences for non-venomous snake species found			Total
	Slough	Scat	Hatched egg-shells	
Manamadhi	IRS7;CBTS1;CWS1			IRS7;CBTS1;CWS1
Karumbakkam	IRS20;CBTS4;SK5			IRS20;CBTS4;SK5
Mambakkam	IRS33;CBTS7;CWS2; SK3;CVS1	IRS1		IRS34;CBTS7;CWS2; SK3;CVS1
Polacheri	IRS24;CBTS2;CWS2; SK1;CKB2	IRS3	IRS4	IRS31;CBTS2;CWS2; SK1;CKB2
Kolathur	IRS24;CBTS2;SK11; CVS2;CKB2	IRS1		IRS25;CBTS2;SK11; CVS2;CKB2
Anandapuram	IRS68;CBTS3;CWS1; SK1;CKB2;RKS1	IRS5		IRS73;CBTS3;CWS1; SK1;CKB2;RKS1
Total	IRS 176;CBTS 19;CWS 6;SK 21;CVS 3;CKB6;RKS1	IRS10	IRS4	IRS 190;CBTS 19;CWS 6;SK 21;CVS 3;CKB 6;RKS 1

Appendix 1: Record of the snake species found

Snake species found	Common English name	Abbreviation used here
<i>Naja naja</i>	Common Cobra/Spectacled Cobra	CC
<i>Bungarus caeruleus</i>	Common Krait	CK
<i>Vipera russelii</i>	Russell's Viper	RV
<i>Ptyas mucosa</i>	Indian Rat Snake	IRS
<i>Dendrelaphis tristis</i>	Common Bronzeback Tree Snake	CBTS
<i>Amphiesma stolatum</i>	Striped Keelback	SK
<i>Xenochrophis piscator</i>	Chekered Keelback	CKB
<i>Ahaetulla nasuta</i>	Common Vine Snake	CVS
<i>Lycodon aulicus</i>	Common Wolf Snake	CWS
<i>Oligodon taeniolatus</i>	Russell's Kukri Snake	RKS

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**AN ANNOTATED CHECKLIST OF REPTILIAN FAUNA
OF BASSI WILDLIFE SANCTUARY, ARAVALLI HILLS,
NORTHWEST INDIA**

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Bassi Wildlife Sanctuary (74° 40'-75° 56'E and 25° 55'-25° 08' N), established in 1988, is located in Southern Aravallis of Rajasthan. It covers an area of 138.69 sq km. The terrain is hilly and rugged with altitude ranging from 250 to 600 meters asl. The Sanctuary provides a natural habitat for varied species of wild life. This is a haven for wildlife enthusiasts. Despite being situated in the northwest India, in Rajasthan state the sanctuary is rich in water sources, particularly the south-western region, where perennial springs and river systems are present. The main tree species of the forest are *Anogeissus pendula* and *Acacia catechu*, covering more than 80% of the forest area. Cultivated areas and human habitation are found in the villages, in and around the Sanctuary.

The sanctuary experiences a humid climate as this tract is sub-tropical, and is characterized by distinct winter (November-February), summer (March-June)

and monsoon (June-October) seasons. Average rainfall is 800 mm and temperature seldom falls below 8°C in the winter and never rises above 46°C in the summer.

Earlier, some studies were carried out to explore the reptilian fauna in the southern Rajasthan (Bhatnagar and Mathur, 2009; Bhatnagar *et al.*, 2010; Shalini and Pandey, 2007; Sharma, 1995; Sharma, 1997; Sharma 2001; Sharma, 2003; Sharma 2007) but none of the above studies included the reptilian fauna of Bassi Wildlife Sanctuary. Survey was conducted for the last six years, i.e., from 2005 to 2010. Reptile species records were maintained for the following selected areas of the Sanctuary: Amjhari, Bara Magra, Bokaria, Bassi dam, Bhungaria, Jaleshwar, Kotha, Nandwas, Neem Ghati, Ori dam, Rajpuria. Identification was based on available literature. This is the first reptile checklist for the sanctuary.

During the study period, a total 27 species of reptiles belonging to 11 families were documented (Table 1). Out of these, 1 species of turtle, 11 species of lizards and 16 species of snakes were recorded. Among them, 25 species in 9 families belong to order Squamata (92.6%) and remaining 2 species in 2 families belong to order Testudines (7.4%). Of these, Colubridae stands as the largest family representing 8 species (29.6%). Boidae, Gekkonidae and Scincidae are each represented by 3 species, Agamidae, Elapidae and Viperidae are each represented by 2 species and Chamaeleonidae, Trionychidae, Typhlopidae and Varanidae are each represented by 1 species. Of these 37.8% (7 species) was common, 29.9% (11 species) were less common, 29.9% (2 species) were Very common, and 32.3% (7 species) were rare.

Table 1. Reptilian species recorded in Bassi Wildlife Sanctuary during 2005 to 2010

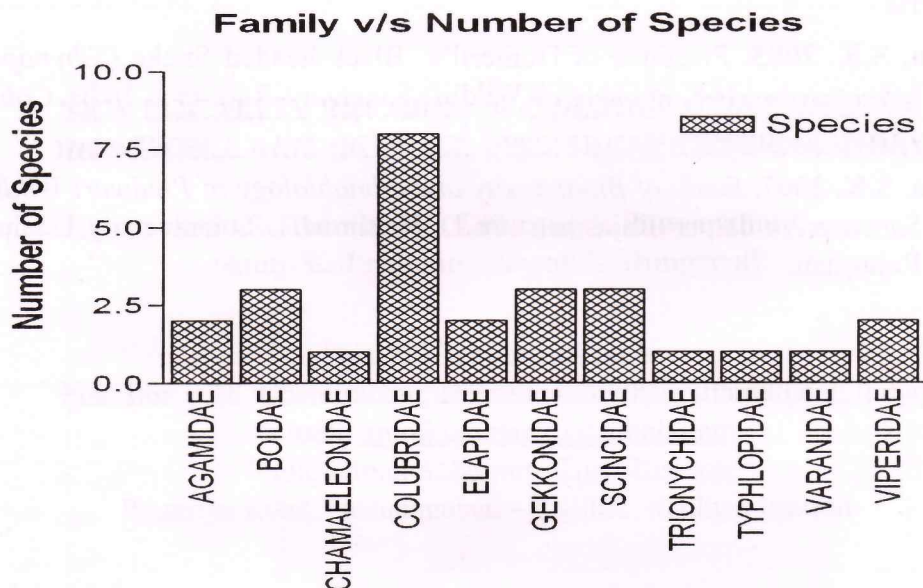
S.No.	Family	Species	Common Name	Local Name	Local Status	Venom
1	TRIONYCHIDAE	<i>Lissemys punctata</i> (Lacepede)	Flap Shell Turtle	Kachhwa	R	NA
2	GEKKONIDAE	<i>Hemidactylus flaviviridis</i> Ruppell	Northern House Gecko	Bashumra	C	NA
3		<i>Hemidactylus brookii</i> Gray	Brook's Gecko	Bashumra	LC	NA
4		<i>Hemidactylus triedrus</i> (Daudin)	Termite Hill Gecko	Bashumra	R	NA

S.No.	Family	Species	Common Name	Local Name	Local Status	Venom
5	AGAMIDAE	<i>Calotes versicolor</i> (Daudin)	Common Garden Lizard	Kangatia	VC	NA
6		<i>Sitana ponticeriana</i> Cuvier	Fan throated Lizard	Pankha	LC	NA
7	CHAMAELEONIDAE	<i>Chamaeleo zeylanicus</i> Laurenti	Indian Chameleon	Halan-meha	R	NA
8	SCINCIDAE	<i>Eutropis carinata</i> (Schneider)	Brahminy Skink	Nagar-bamni	VC	NA
9		<i>Eutropis macularia</i> (Blyth)	Little Skink	Nagar-bamni	LC	NA
10		<i>Lygosoma punctata</i> (Gmelin)	Snake Skink	Nagar-bamni	R	NA
11	VARANIDAE	<i>Varanus bengalensis</i> (Daudin)	Common Indian Monitor	Gho	C	NA
12	TYPHLOPIDAE	<i>Ramphotyphlops braminus</i> (Daudin)	Brahminy Worm Snake	Keet or Andha Saanp	C	NV
13	BOIDAE	<i>Eryx conicus</i> (Schneider)	Common Sand Boa	Khurdara Doom Boa	LC	NV
14		<i>Eryx johnii</i> (Russell)	Red Sand Boa	Dumbi	LC	NV
15		<i>Python molurus molurus</i> (Linnaeus)	Indian Rock Python	Ajgar	R	NV
16	COLUBRIDAE	<i>Coelognathus helena helena</i> (Daudin)	Common Trinket Snake	Aabhushit Saanp	LC	NV
17		<i>Ptyas mucosa</i> (Linnaeus)	Common Rat Snake	Dhaman	LC	NV
18		<i>Oligodon arnensis</i> (Shaw)	Common Kukri Snake	Kukri saanp	LC	NV

S.No.	Family	Species	Common Name	Local Name	Local Status	Venom
19		<i>Dendrelaphis tristis</i> (Daudin)	Common Indian Bronzeback		R	NV
20		<i>Lycodon aulicus</i> (Shaw)	Common Wolf Snake	Kauriyala	C	NV
21		<i>Xenochrophis piscator</i> (Schneider)	Checkered Keelback	Dendo	C	NV
22		<i>Amphiesma stolata</i> (Linnaeus)	Buffstriped keelback	Dharidar Dendo	R	NV
23		<i>Boiga trigonata</i> (Daudin)	Common Cat Snake	Manjra	LC	MV
24	ELAPIDAE	<i>Bungarus caeruleus</i> (Schneider)	Common Indian Krait	Karait	C	V
25		<i>Naja naja</i> (Linnaeus)	Indian Cobra	Kala saanp	C	V
26	VIPERIDAE	<i>Daboia russelii</i> (Shaw and Nodder)	Russell's Viper	Badi Chitti	LC	V
27		<i>Echis carinatus</i> (Schneider)	Saw Scaled Viper	Chhoti Chitti	LC	V

- ☐ R (Rare), LC (Less Common), C (Common), VC (Very Common)
☐ Venomus (V), Mildly venomous (MV), Not applicable (NA), Non-venomous(NV)

Figure 1. Total number of Species in each family recorded in Bassi Wildlife Sanctuary during 2005 to 2010



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NEW LOCALITY RECORD OF *COELOGNATHUS HELENA* *MONTICOLLARIS* (SCHULZ, 1992) FROM CENTRAL INDIA

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Introduction

In India, the genus *Coeleognathus* Fitzinger is represented by four taxa *C. flavolineata* (Schlegel), *C. radiatus* (Boie), *C. helena helena* (Daudin) and *C. h. monticollaris* (Schulz) (Javed et. al. 2010). The montane trinket snake *Coeleognathus helena monticollaris* (Schulz, 1992), a common and endemic species found mainly in the Western Ghats was recorded in central India from Satpura Tiger Reserve, Hoshangabad, Madhya Pradesh, during the intensive study: "Monitoring Tiger, Co-predator, Prey & their Habitat". Authors found a live specimen of *C. h. monticollaris* on 7th November 2010 at 08:30 hrs. in a moist deciduous forest dominated by *Shorea robusta* at Pachmarhi range (22° 27' 35.59" N- 78° 22' 15.56" E) at elevation of 1151m. During data collection it was crossing an animal trail. The specimen was photographed and released after collecting morphological data. The specimen was identified based on the description available in literature (Schulz, 1996; Whitaker and Captain, 2008). The species was categorized by CAMP assessment as "VULNERABLE" according to IUCN criteria (Molur & Walker, 1998).

Study Area

Satpura Tiger Reserve (22°19'-22°30'N 77°56'-78°20'E) is a 1427.87 km² protected area located in the Hoshangabad district of Madhya Pradesh state in Central India. It comprises of Pachmarhi and Bori Wildlife Sanctuaries and Satpura National Park (Edgaonkar, 2008). It has six ranges: Park Pachmarhi, Park Kamti, Pachmarhi, Bori, Game range Matkuli, Game range Bhaura. The terrain is hilly and highly undulating. Forest is mainly dominated by *Tactona grandis*, *Shorea robusta*, *Bauchania latifolia*, *Terminalia arjuna*, *Emblica officinalis*, *Madhuca indica*, *Rauwolfia serpentina*. The forest types consist of southern moist mixed deciduous, southern dry mixed deciduous and dry peninsular Sal forests (Champion and Seth, 1968).

Distribution

Montane trinket snake *Coelognathus helena monticollaris* was considered to be endemic to Western Ghats and reported from Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Whitaker & Captain, 2008). In Central India, Nande & Deshmukh (2007) reported distribution in Melghat based on a rescued specimen from Amravati [Maharashtra] and Thakur (2011) reported a road-kill on Sijhora road from Balaghat district in Madhya Pradesh. Schulz (1996) mentioned specimens having a black "V-mark" on head and neck, from "Madras, South India". There is no other published account of its occurrence outside its earlier reported range namely "South India". Thus, this report is the first record of such a morph from central India.

Description

This is a slender bodied snake with smooth scales. It was golden brown in colour with transverse black bands and a distinct "V" mark on the head and neck. The bands consist of several rows of large pale yellow oval or round spots encircled with black. Hind body with lateral stripes, belly white, with a series of black markings on each side, eyes with round pupil. Total length 118 cm. Dorsal body scales in 26:27:27 smooth rows. Scales on hind body and tail weakly keeled. Supralabial 8, 4th and 5th touching eye, Preocular 1, Postocular 2, Temporal 2+2, 224 ventral scales; 88 pairs of sub-caudal, anal plate divided. It was a male specimen as identified from hemipenis.

Acknowledgement

The Authors are thankful to the herpetologists Dr. Abhijit Das, Dr. Kartikeyan Vasudevan and Shri. Anil Kubal for identification of species and encouragement. We are especially thankful to Dr. Y. V. Jhala and Shri. Qamar Qureshi for providing us this wonderful opportunity to get involved in the "All India Tiger Monitoring Project". Thanks to Mr. M. Bubesh Gupta, Mr. Anirudh Vasava and Tiger Den researchers for their useful comments on the manuscript.

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Image 1. Map of Satpura Tiger Reserve showing the location of *C. h. monticollaris*

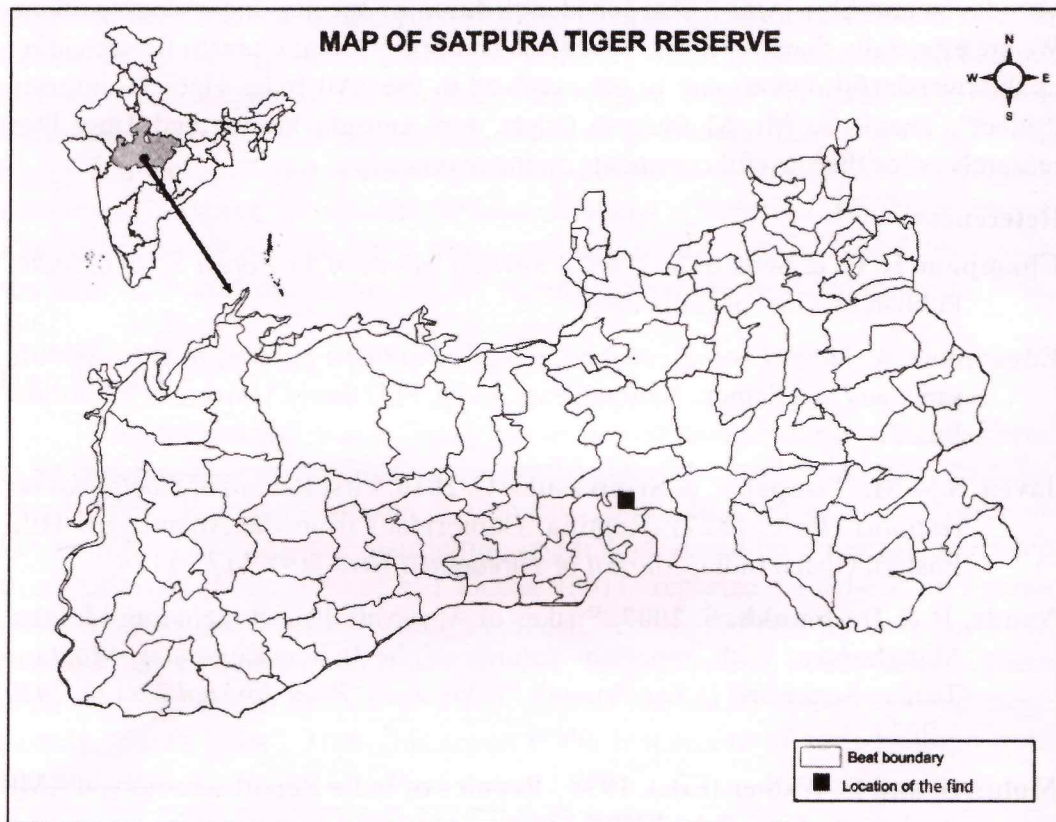


Image 2. Photographs of the Central Indian specimen of *C. h. monticollaris*. (See also cover photo - top image)



RANDOM HARVEST

The monster creature and the monster hoax

Leafing through a back number of the Ichthyological and herpetological journal *Copeia* (2000, No.4), I came across a review of Harold Heatwole's acclaimed work, *Sea Snakes* (1999. 2nd ed.). The reviewer complains that the section in the book on giant mythical serpents is out of place in a scientific book and "not a very insightful approach to the topic" since it makes no mention of the most famous of such creatures, the Loch Ness Monster "and the amazing fact that it has been given a scientific name". Well, if this could be described as an "amazing fact", an even more amazing fact is that no one discovered for long that this was a hoax. It was the famed British naturalist, Sir Peter Scott, who gave it the Latin name *Nessiteras rhombopteryx*, meaning "the wonder of Ness with the diamond-shaped fin". The joke is that this is, in fact, an anagram of 'monster hoax by Sir Peter S'!

* * * *

Exotic herpetofauna of Florida

Florida has now the distinction of having the largest number of established non-indigenous herpetofaunal species in the world. In a paper by Krysko *et al.*, in the journal *Zootaxa*, no. 3028, an extensive account is given on exotic (= non-indigenous) species of amphibians and reptiles found in Florida. The work, which is based on about two decades of field work along with scrutiny of natural history museums and published literature, confirms three intercepted and 137 introduced species of herpetofauna in Florida. The authors list a whopping 83 newly confirmed taxa, including 56 which have become reproducing populations (3 frogs, 4 turtles, 1 crocodilian, 43 lizards, 5 snakes) in Florida.

The paper discusses the possible pathways through which these species might have ended up in Florida. The threat and competition that these non-native species impose on the native ones are also discussed and it is urged that the total

eradication of these species will be the only way to save the native animals of Florida.

The authors admonish the residents of Florida and policy makers / government / other agencies to be extremely careful about illegal pet acquisition, trade etc. The authors urge them to be fully aware of the problems created by non-native species to the fragile ecosystem. So much so they recommend that, at the very least, those responsible for such introductions should be held accountable for payment of compensation towards the extermination of those species.

* * * *

Males and young ones of a rare Indian gecko found

The paper titled "Discovery and first description of male *Cnemaspis heteropholis* Bauer, 2002 (Reptilia: Gekkonidae) from Agumbe, central Western Ghats, India" authored by S.R. Ganesh *et al.* published in the *Journal of Threatened Taxa*, speaks of the discovery of males and young ones of a rare day-gecko *Cnemaspis heteropholis* found only in the Western Ghats. The ground work for the paper stems from the authors' field excursions in and around the Agumbe Rainforest Research Station, located in southwestern Karnataka. This gecko was first described based only on one female specimen in Germany's Berlin Museum, collected from the Gund hill range in northwestern Karnataka. After many years, this species was sighted in Pushpagiri, in southern Karnataka. Since the Pushpagiri specimens were not examined morphologically, that record could not throw more light on this gecko.

The authors who found two adult males and two young ones of this species described these specimens in detail and have furnished considerable new data. The paper points out that such data like the 'preanofemoral pores' which are present only in males, are important in proper taxonomic identification of these geckos. These data, given by the authors for the first time, could not be provided in the original description, as that specimen was a female.

The sightings from Agumbe have also provided a new locality record for this gecko, although this is within the known geographic range of the species. The paper concludes by mentioning that the species might occur in a wide range of biotopes between the Palghat and the Goa gaps in the Western Ghats and recommends further studies on this species.

* * * *

A fresh look at lizard intelligence

Conventional wisdom has it that lizards are worse than “bird-brained”. In other words, even though lizards, just as birds, are ruled more by instinct than by intelligence, they are notches below birds in this regard.

But, a report in *The Economist* of July 16, 2011 tells a different story. It refers to a paper published in *Biology Letters* by Dr. Manuel Leal and Brian Powell of Duke University in North Carolina detailing the research done on the lizard *Anolis evermanni* “through a triathlon of cognitive tests of the sort used on tits (and other birds and mammals that ethologists wish to investigate)”. First, the reptiles had to learn how to extract a tasty grub from a container. Then they were taught to associate the grub with a particular colour. Finally, they were taught to dissociate it from that colour and learn that a different colour was the give-away.

“The lizards were able to manage all three tasks with ease matching the performance of tits in similar tests”, thus establishing that “lizards are atleast as clever as birds at such simple tasks”.

* * * *

Morphological variations in a shieldtail species

In *Taprobanica* Vol.3, No.1 pp 11-14, S.R Ganesh, Research Scientist, Chennai Snake Park Trust, writes on the morphological variations found in some specimens of the rare three-lined shieldtail (*Platyplectrurus trilineatus*) that is confined to the southern Western Ghats of India. Specimens of this snake, five in number, housed in the Chennai Snake Park museum, though conformed to the existing literature on this species, varied in two aspects of scalation viz. ventral scale count range (159-183 vs. 163-177 in literature) and the size of prefrontal scale relative to that of the supraocular scale (supraocular larger than prefrontal vs. smaller than prefrontal in literature). The paper points out that such variations in scale count could have occurred for the reason there have been revisions in the method of counting ventral scales in shieldtail snakes, and that variation in size of supraocular scales could have been due to the fact that these specimens are juveniles. He concludes by recommending further studies on the morphology of this species.

* * * *

Two new species of shieldtail snakes from Sri Lanka

Shieldtail snakes, comprising the family Uropeltidae, is a group of small to medium-sized (20-50 cm long) burrowing snakes restricted to the wet, hill-forests of peninsular India and Sri Lanka. They are found nowhere else in the world. Forty four species belonging to eight genera are presently considered valid. Of these, five genera viz. *Melanophidium*, *Teretrurus*, *Brachyophidium*, *Plectrurus* and *Platyplectrurus* are restricted to the Western Ghats of India; one genus *Pseudotyphlops* is restricted to Sri Lanka and two genera *Uropeltis* and *Rhinophis* are distributed both in peninsular India and Sri Lanka. One plausible reason for this distribution pattern is that the endemic genera (except the low-elevation dwelling *Pseudotyphlops*) are mostly high-altitude taxa that could not cross the lowland barrier and disperse into the adjacent landmass of Sri Lanka, whereas the widespread genera *Uropeltis* and *Rhinophis* also occur at low-altitudes and, therefore, could have very well colonized both these landmasses during prehistoric times when there were intermittent land-bridge connections due to fluctuations in sea-levels.

It is noteworthy that the genus *Uropeltis* has its evolutionary radiation centre in the Western Ghats of India with 21 species in India and only two species in Sri Lanka; while the genus *Rhinophis* is represented by only three species in southwestern India even though ten species are found in Sri Lanka, two of which have been described recently.

A significant contribution to Sri Lankan shieldtail snakes appears in the journal *Zootaxa* No. 2881, titled "Two new species of *Rhinophis* Hemprich (Serpentes: Uropeltidae) from Sri Lanka" authored by David Gower of the British Museum and Kalna Maduwage of Sri Lanka. The authors describe two species of shieldtail snakes new to science from Sri Lanka. *Rhinophis lineatus* is described from Harasbedda, near Ragala in the hill-forest country. This species is easily distinguished from other related shieldtails in Sri Lanka and India by its unique lineated or striped markings on the back and hence the name. *Rhinophis zigzag* is described from Bibilegama, near Passara in the hilly, wet-zone of the island. This one possesses rather unique 'zig-zag' markings on the back. Whilst writing about these new species, the authors emphasize on exhaustive description of several scalation and other morphological characters that had, till-now, remained unutilized as tools for improving our current state of knowledge of uropeltids.

* * * *

On the trail of the vanishing (hopefully, not vanished) amphibians

Sanctuary Asia vol.XXXI No.4 Aug.2011 carries an inspiring account of the efforts of one man to save the disappearing amphibians in the country. This is in the form of an interview by the magazine's editor, Bittu Sahgal, with S.D. Biju, "one of the world's foremost amphibian experts" Biju works in the faculty of the Department of Environment Biology, University of Delhi and has been in the field of amphibian studies for two decades and has been conducting survey and research on amphibians all over India. He says that though world-wide, the amphibian population has been suffering serious declines for many reasons and, particularly, U.V. radiation, Chytrid fungus, etc. in India, the primary cause is habitat destruction. According to Biju, India has the maximum number of missing species of amphibians. After he launched his Lost-Amphibians-of-India, they have discovered some 25 species not seen for over 50 years, some for 100 years. 230 members have registered as volunteers in this programme. They have already conducted 12 specific searches and another 18 would be conducted within the next two months. Biju feels that if they are able to locate atleast 30 of the vanished species, that would be a great achievement for Indian amphibian research and conservation. Anyone interested in this research may visit:

<https://www.facebook.com/pages/Lost-Amphibian-of-India/126212394110450>

– B. Vijayaraghavan

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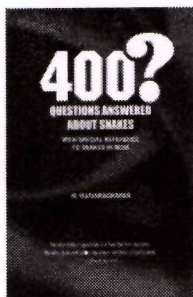
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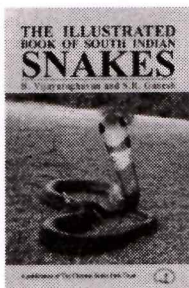
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Chennai Snake Park Trust
Rajbhavan Post, Chennai – 600 022. India.
Phone: 91-044-22353623
E-mail: cspt1972@gmail.com
Website: cspt.in

Printer : N. Arunachalam, Students Offset Services
Shop No. 3, Apex Chambers, 20, Thiagaraya Road, Pondy Bazar, Chennai - 600 017.
Publisher : R. Rajarathinam on behalf of Chennai Snake Park Trust. Published by Chennai Snake Park
Trust, Rajbhavan Post, Chennai - 600 022
Editor : Dr. S. Paulraj, IFS (Retd.)

