

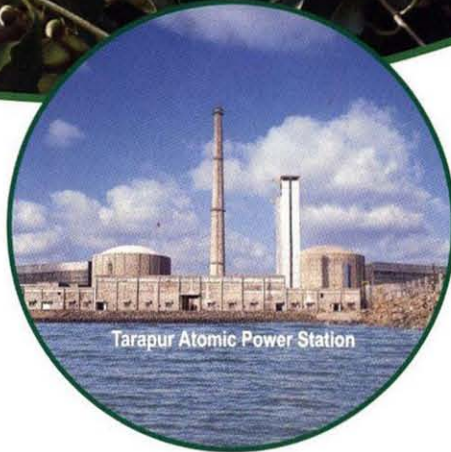
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DISCOVER THE LIVING WORLD

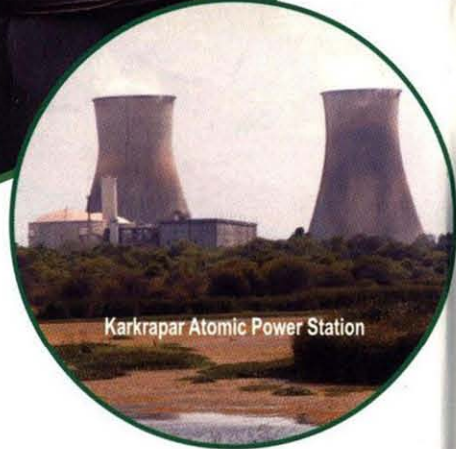
APRIL-JUNE, 2009



BOMBAY NATURAL HISTORY SOCIETY



Tarapur Atomic Power Station



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Nilgiri Woodpigeon
(*Columba elphinstonii*)

The Nilgiri Woodpigeon is one of the 16 bird species endemic to the Western Ghats in India, and is restricted to the moist evergreen forests. It occurs from Kerala northwards to about 19°N including the Anaimalai Hills, the Nilgiri Hills and the hills of western Karnataka, Goa and Maharashtra. It is generally not very sociable and does not live in large flocks as most pigeons do. This pigeon qualifies as Vulnerable owing to its small, declining population, as a result of widespread destruction of its forest habitat.

It was once considered common and widespread, but has undergone a major decline, due to habitat loss and hunting. Currently, the loss, degradation and increasing fragmentation of forest are a greater concern. It is legally protected in India and locally common in Kerala and Tamil Nadu.

It mainly breeds in natural forest but it does more in 'wattle' plantations and occasionally visits moist deciduous forest, *Pinus* and *Eucalyptus* plantations to roost and preen. However, it is absent from tea and *Acacia* plantations. Most breeding takes place in montane temperate (shola) forests above 2000 m and in very low densities in evergreen forests in mid-altitudes of 900 to 1800 m. It appears to make some nomadic movements in

other species in the Western Ghats. It generally breeds from March to July.

Human beings are the major contributors in the decline of this species through habitat degradation and hunting. However, it can be seen in and around the Exclusion Zones of NPCIL plants like NAPS, KAPS, RAPS and TAPS.

The Environment Stewardship Programme (ESP) of NPCIL, a voluntary programme, envisages scientific study of biodiversity, particularly avifauna, in the Exclusion Zones (EZs) and the environs of its seven nuclear power stations. EZ is a 1.6 km radius area around the centre of the nuclear plant. While only a fraction of this area is used for the plant structures, remaining is used for green-belting. A large number of bird species have made the EZs their homes. The programme also includes training of local volunteers, public awareness campaigns to sensitise members of the public on protecting the environment, improving habitat, particularly of avifauna.

NPCIL as a responsible corporate citizen, realizing the importance of a healthy environment, believes that the aforementioned efforts will help in promoting habitat conservation and awareness to make the world a better place to live in.



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C O N T E N T S

The Day of the Shingu!

Kulbhushansingh Suryawanshi takes us to a clash between the Tibetan Wolf (*Shingu*) and Blue Sheep (Bharal) that reach new heights in their trans-himalayan set up ... find out whether it was truly the day of the Shingu or the demure and determined Bharal!



Caecilians Decoded

Is it a snake? Is it an earthworm? No! it's a Caecilian! Varad B. Giri gives us the 'whats', 'whys' and 'hows' of these legless amphibians bringing an end to the general curiosity and mystery surrounding these small animals.



Caracal: A cat that stole the show

Dharmendra Khandal narrates an intriguing tale from the bushes of Ranthambhore; it is about a cat who can eat your soul! An elusive animal rarely ever seen – The Caracal.

Others...

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Conservation Parochialism

Conservationists always emphasize that conservation should become people's movement, and in some cases it has, and locals have reaped the benefit. But sometimes people's conservation can also take an ugly turn, which I term as conservation parochialism or conservation regionalism. Let us take some examples on how this conservation parochialism based on ignorance, misguided regionalism, and pure political obstinacy is harming conservation movement in our country.

Protection, restoration, and rehabilitation of habitats and species are the pillars of modern conservation movements. Conservation of Asiatic Lion, mistakenly and parochially termed as Gir Lion, is one such fine example. In his lovely and authoritative book *The Asiatic Lion*, Divyabhanusinh has described how the Nawab of Junagadh almost went to war with his neighbours when they were enticing the lions into their territory to shoot them. The Nawab had totally banned lion hunting in his territory, except in rare cases. Thanks to his wisdom and foresight, the Asiatic Lion was saved else it would have become extinct from Gir too, like it has from many parts of its known distribution from India to the Middle East. Within India, it was found north and west of the Narmada river in Gujarat, Madhya Pradesh, Rajasthan, Punjab, Haryana and Uttar Pradesh. Its former distribution is well-documented, sadly as hunting records.

The Maharajah of Gwalior was the first to reintroduce lions in his estate, and an elaborate "Shergarh" was established where African Lions were released. Unfortunately, the experiment failed as no post-release monitoring was done. The second experiment in Chandraprabha Sanctuary in Uttar Pradesh also failed as monitoring was not done. Since those two experiments, we have come a long way.

In the early 1980s, when I was working in the Karera Bustard Sanctuary in the Shivpuri district, I visited a neglected sanctuary called Kuno-Palpur in Sheopur district. Before that I had visited Gir and I was struck with the similarity of habitat of the two forests. By late 1980s, the Government of India decided to find a second home for the Asiatic Lion, and Dr. Ravi Chellam of the Wildlife Institute of India was given the task of finding a potential location. He found Kuno-Palpur Sanctuary to be ideal among the three sites which he visited (the other two being Darrah and Sitamata wildlife sanctuaries of Rajasthan). An extremely praise-worthy plan was implemented by the Madhya Pradesh State Government and Ministry of Environment and Forests to make Kuno-Palpur suitable for Asiatic Lion. The Government of Gujarat was kept informed that a second home for Asiatic Lion was being developed and it was expected that Gujarat would give a pride or two for restoring lions to their former home. Meanwhile, the lion population had risen to more than 400, and spilled out of the Gir forests, so there was no dearth of some individuals/prides which could be relocated to Kuno-Palpur, without taking any lion from Gir National Park and Sanctuary. But, how can one do this when misguided conservation parochialism rules over common sense?

Despite numerous requests from the Government of India, the Gujarat Government is still refusing to give any lion as they are the 'pride' of Gujarat. In order to hide their narrow conservation parochialism, they give spurious argument as how the 'Gir' lions will not survive in Kuno-Palpur. The most hilarious argument, given in an affidavit, is that in Kuno-Palpur the temperature can go up to 48 °C, while in Gir it does not exceed 40 °C! At one time the Asiatic Lion was found in Madhya Pradesh, Punjab, and Rajasthan where temperatures can go up to 48 °C in summer. Another argument is that Kuno-Palpur has a tiger population; so fights between these big cats may result in the lions being killed. Big cats do fight for their territory, but behavioural, ecological and niche separation take place. They may not like each other, but finally temporal and spatial separation help them co-exist, as can be seen between tiger and leopard, and lion, leopard and cheetah in Africa. A few hundred years ago when lions were more widespread and cheetahs had not become extinct in India, there may have been many areas where lions, leopards and tigers must have co-existed, and where lion, leopard and cheetah may have shared the same habitat. Perhaps there were some areas with thick forest, scrub



forest and grassland where all four were surviving, probably not as the best of neighbours, but nonetheless separated only by their ecological niches, and time and space.

Another example of conservation parochialism is the rhino reintroduction in Dudhwa National Park in 1984. I remember having a heated argument with the Director of the Manas Tiger Reserve when he said that Assam Rhinos (there is no creature by this name, anyway) will not survive in Dudhwa as temperatures there can go to 1-2 °C, and 40% of the grasses found in Assam are not found in Dudhwa (based on the study by the Botanical Survey of India). I told him that if temperature determines the distribution of Rhino, then how come they are found in Nepal where it can go to minus 0 °C in winter? Incidentally, the One-horned Rhinoceros was found all over the Gangetic and Punjab plains, and even up to Peshawar where Emperor Babar killed a rhino on his way to India! And, instead of saying that 40% grass species are not common in Dudhwa and Assam, why can't one say that 60% are common!

Thanks to Mrs. Indira Gandhi's determination and bold steps, five rhinos were airlifted from Assam and successfully reintroduced in Dudhwa. When two rhino females died, the Assam government refused to part with more rhinos, so the Indian Government bartered two female rhinos from Nepal in exchange for 16 elephants. Now the population has increased to 30 animals in Dudhwa. I must add here that I greatly appreciate the love and affection of Assamese people towards rhinos, and their *Vision 2020* to have 3,000 rhinos in Assam is praiseworthy, but they should remember that the safety of the rhino, or any species, is to rehabilitate it in as many areas of its former distribution as possible. Incidentally, rhinos are found in West Bengal (Jaldapara and Gurumara) and Nepal (Chitwan, Royal Bardia, Sukla Phanta), besides reintroduced ones in Dudhwa, so unlike the Asiatic Lion, the Rhino is not found in only one state.

Lifting of vulture fledglings for the BNHS Vulture Conservation Breeding Centres at Pinjore, Buxa, and Rani Forest Range was another unsavoury experience, which we faced in many states, on the same spurious plea that 'we will not allow our vultures to be taken to other states', as if the vultures live within state boundaries. It is another matter that these bleeding heart conservationists will not do anything to stop the sale of the killer-drug diclofenac, which has killed millions of vultures, but if a few fledglings of vultures are lifted from nests for government-sponsored and scientifically executed breeding programmes, all their conservation emotions come into play.

There are many species with a single declining population. The first principle of conservation biology is to see that such species are fully protected, and attempts made to rehabilitate them to their former habitats to prevent inbreeding, to provide genetic resilience which comes when a species is living in wide habitat zones, and most important, to save them from stochastic events which a single population can suffer suddenly. The looming danger of climate change and social chaos also suggest that it is sensible to have a rare species distributed in a wider area so if one habitat is destroyed due to non-preventable reasons, at least it will be surviving in other areas. But will the misguided parochial conservationists, whose only aim seems to get some media mileage in a local newspaper, listen to scientific reasoning?

Perhaps such animal lovers should fly from Gujarat to Nepal to Assam and tell me if they can recognize the political and administrative boundaries through which we have stupidly divided this Earth. Animals know only ecological and physical boundaries. The Bar-headed Goose flying from the wetlands of the Tibet plateau will not know when it has crossed from Tibet (China) to Nepal to India, but it will know when it has crossed the Himalayas and has come to the warm Gangetic plains. The White-backed vulture does not know whether it has nested in Madhya Pradesh or Bihar. A rhino will be happy munching grass whether it is the Brahmaputra plains or the *terai* grasslands as long as no one puts bullets into his head.

The Day of the *Shingu!*

Text and Photographs: Kulbhushansingh Suryawanshi



A young male Bharal exhibiting his skills by descending a steep hill with easy grace

I reached Tashigang on an early December afternoon. This small hamlet of six houses was almost empty, but for a stray dog that ran across the road. All around me was dust and small patches of dry grass. A cloud of dust followed me as I walked the street. It all felt like a scene from one of Clint Eastwood's Wild West flicks. But the towering beacon of Cho-Cho Kang Nilda standing at 6,300 m above sea level with its snow cap glittering in the afternoon sun brought me back to reality. I was in a Trans-Himalayan village at 4,350 m above sea level in the Kibber Wildlife Sanctuary (WLS). Even at noon the temperature was around minus fifteen degrees Celsius. Kibber WLS with a mean altitude of 4,500 m above sea level is one of the best habitats for some of the rare high altitude wild animals like Bharal, Ibex, Snow Leopard and Tibetan Wolf.

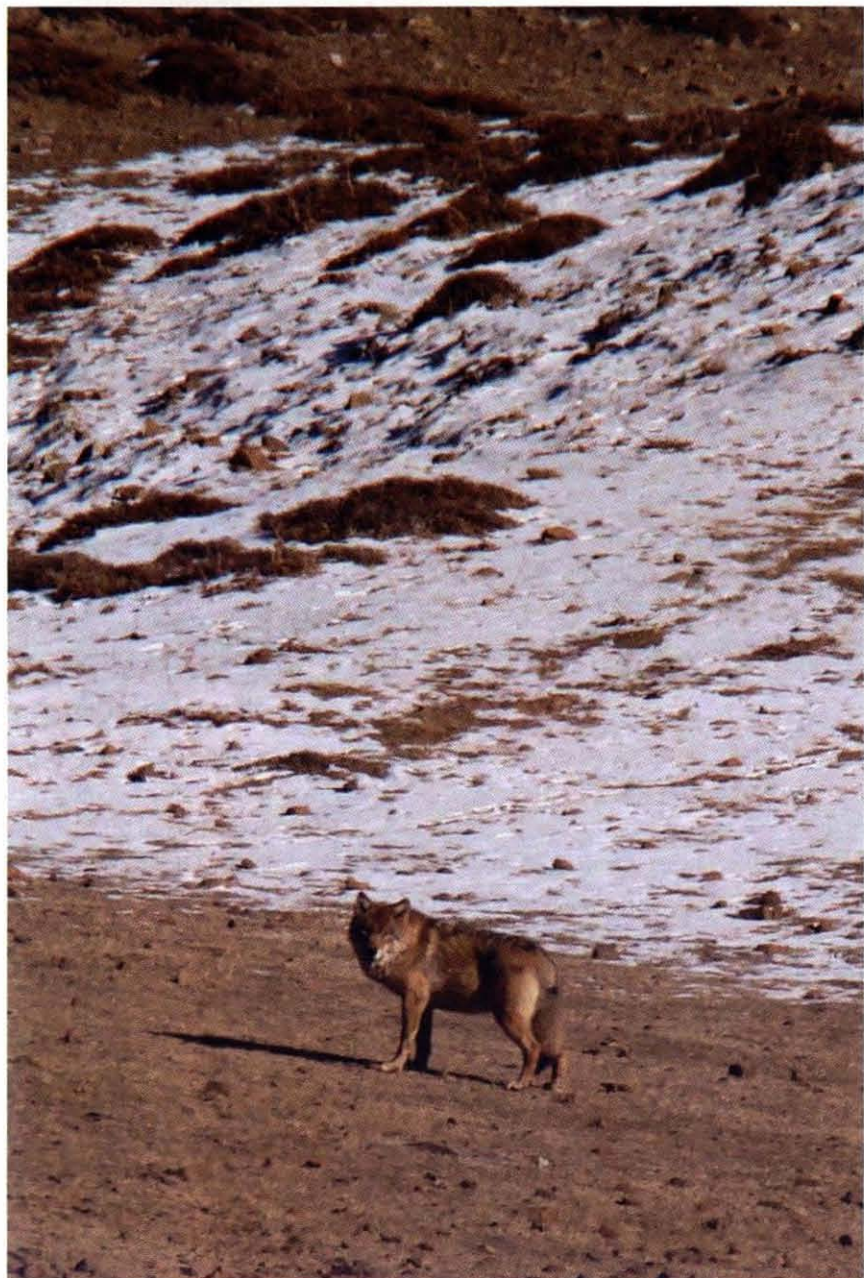
I was in Kibber to start field work for my Masters Dissertation project on the winter foraging strategies of Bharal *Pseudois nayaur*. Kalzang Pulzor and Tenzin Takpa were to help me with my field work. We had set up our camp at Tashigang, a small village well tucked inside the mountains with only twenty permanent residents; it feels especially remote here during winters. Since the day I reached here I had been hearing about a pack of eight wolves (Tibetan wolves *Canis lupus chanco*) that had frequently been seen around the village. The boldness of this pack had made them the talk of most villages on the Kibber plateau; but in spite of their frequent visits relatively little livestock had been attacked. People were not despising the presence of wolves, but past memories of them killing as many as 20 sheep and goat in a night haunted many and kept them on guard.

It was the seventh day since field work had started. We were well acclimatised and had taken to the field

work with great enthusiasm. My thermometer read twenty-one degree Celsius below zero. As soon as the sun came up, Kalzang and I were out searching for the group of sixty Bharal that we had seen the previous evening. This was also the rutting season of the Bharal and we were interested in seeing the males ram their horns to win the females in the herd. On the day of

observation, the herd split in two with the larger herd numbering thirty-four and the smaller one with twenty-six Bharal. So, we also decided to split, Kalzang went towards the smaller group while I followed the larger.

By mid afternoon the Bharal settled down at around a hundred metres from the cliffs. I also settled down in the middle of some boulders with the



Shingu (Tibetan Wolf) and Shin (Snow leopard) are the two large predators in this region



United we stand seems to be the motto of the Bharal

Bharal in sight and protecting myself from the cold wind that had picked up by now. I was at a height same as the Bharal, but perfectly concealed from any observer lower down by the boulders. An hour went by and the Bharal were still resting. I suddenly spotted some movement in the cliffs and rocks below ... Wolves, eight of them! The Bharal had not seen them yet as they could hardly see in that direction from their lying position. The Bharal had been focusing mainly on the side away from the cliffs. The wolves then spread out and charged up the gentle surge of the hill that connected the Bharal to the cliff. The charge was being led by two adult wolves, followed

by six more, of which two were barely staggering behind. Before I could turn my attention to the Bharal I heard their thundering hooves. They were charging towards the cliff! The direction of the wolf charge and their position had placed them between the cliffs and the Bharal. The wolves were actually trying to cut the Bharal from the cliffs. The Bharal ran at an angle to the wolves towards the cliffs. The task for the wolves was to isolate a single Bharal and course it down before the herd could make it to the cliffs. The thundering hooves *whooshed* past the two leading wolves and down on the cliffs in a flash. The Bharal were so tightly clustered that they looked like one body. The

wolves never had a chance to focus on any single individual. The wolves, eventually, had to give up their chase. Everything happened in a flash... only at the end did I realise that I had a camera in my back pack. The Bharal stood wide-eyed watching the wolves from the safety of the cliffs. The wolves gave up and soon left towards a nearby rangeland. That's where Kalzang had gone following the smaller group of Bharal so I was sure he would get to see the wolves.

Although the charge failed, the well-organised attack of the wolves impressed me thoroughly. But what was even more impressive was the escape behaviour of the Bharal. After all, a

herd of wild goats, without a leader, had organised a group escape plan against a fairly large, well organised, pack of one of the fiercest hunters! The Bharal did not have a moment to communicate. The decision of the Bharal to head for the cliffs was risky, as they were not running away from the wolves but towards them, although at a slight angle. The key to the escape had been in their cohesion. Any straggler that would have dared to run away from the cliff would definitely have been chased down. Any chaos in the initial moment would have given the wolves enough time to cut the escape to the cliffs completely.

No single individual could have led the Bharal to the escape terrain. Many might not have had the opportunity to even know what they were running from. There was not enough time for any decision making on part of the Bharal group. The leaderless Bharal clearly followed few simple thumb rules,



The village of Langza located in the rolling hills of the dry Tibetan steppe

which characterise their herding behaviour. On an alarm signal, stay close to your neighbour and run for the nearest cliff, could have been the protocol. The wolves never had a chance to focus on a single individual in the mass of the thundering hooves

as the Bharal kept together. Avoided any form of chaos which could have happened in this case had different individuals decided on different directions to run to for escape. Simple rules at the level of an individual that have evolved over thousands of years



As the name suggests, the Woolly Hare has thick fur to protect it from the cold



The majestic Himalayan Griffon in its snow-capped abode



The snow-covered summit of Cho-cho Kang Nilda (6,300 m)

have led to a significant level of group intelligence.

Kalzang came running to where I was. Breathing hard in the thin air of the high altitude his face had turned red. “*Shingu, eight shingu*” (eight wolves) is all that he could say. I told him about every thing I saw. He told me that the wolves could not attack the smaller group of Bharal as they had been spotted from far. We decided to follow the fresh spoor of the wolves. Soon we saw a wolf again. A lone sentry was sitting high up on a ridge. The pack must have been resting somewhere behind on the ridge while the sentry kept a look out. We then turned back towards camp.

Back at home we were anxious to narrate our experiences to Takpa, who we thought was enjoying his rest day. But, Takpa had his own story to tell. Soon after we had left camp early morning he had heard loud braying of the donkeys that were grazing in the

nearby pasture. Takpa quickly made a dash for the place. A pack of eight wolves had brought down a donkey. It was Takpa’s donkey. The wolves did not get enough time to eat it as they fled on Takpa’s approach. Takpa was not disappointed as he knew he would receive compensation from the Livestock Insurance Scheme. This scheme was started in the region by Dr. Charudutt Mishra and the Nature Conservation Foundation (NCF) along with the Kibber Youth Council. The program helped safeguard the interests of the local people against livestock depredation by wild carnivores and protect the wild carnivore from any form of retaliatory hunting.

Today the populations of Ibex, Bharal, Wolves, Snow Leopard and many other small fauna have recovered in the Sanctuary. Thanks to the many conservation programmes started in the region by the NCF along with the Kibber Youth Council. Programmes

like creation of village reserves and the livestock insurance scheme have helped both, the wildlife of the region and the local communities. The livestock free reserve has led to an increase in wild ungulate population, thus widening the prey base for carnivores like the Wolf and Snow Leopard. Thanks to all these measures sighting a Snow Leopard or a Wolf in the Sanctuary is not as rare an event as in the past.

Takpa, although having lost a donkey to the wolves, ended his story saying “*Aaj to shingu ka din nabi tha*” – ‘it was not the day of the wolves’ – they will have to sleep on empty stomachs. But yes, the days of the carnivores have now come back to the Sanctuary. The days of the *shingu* are back!!! ■

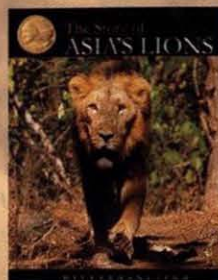


Kulbhushansingh Suryawanshi is a research scholar with Nature Conservation Foundation; currently studying the Snow Leopard and their prey in the Trans-Himalayas.

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By Divyabhanusinh



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An unexpected encounter!

Text and Photographs: **Kamolika Roy Chowdhury**



Caterpillar



Pupa



Emerging butterfly



Head peeping out

The unusually hot weather this summer in Mumbai had successfully kept me away from my occasional sojourns with nature during the weekends. On one such warm day, after waking up at about 7:00 a.m., I groggily headed for the kitchen, to make myself a cup of tea and shake myself out from my sleepy lethargy. While the water was still boiling on the gas, I decided to water the plants kept just outside my kitchen window. With a jar full of water I peeped out of my kitchen window to reach the pots and was totally unprepared for what I saw next. There was a butterfly firmly clinging on to one of the branches of the succulent flowering plant (*Kalanchoe* sp.) that I had planted in a pot a few years back. It was a Red Pierrot *Talicauda nysens*. I had seen it on some earlier occasions too and had ever since secretly harboured a desire to photograph it. Life had unexpectedly presented me with an opportunity not only to observe this butterfly at close quarters but also to fulfill my latent desire. The butterfly was basking in the not-so-harsh morning light as the sun was just beginning to make its journey up the sky. Quickly putting the tea leaves into the already boiling water and leaving the tea to brew, I hurried to get my camera all the while praying that the butterfly would not fly away in the interim.

I heaved a sigh of relief when I found it exactly in the same place on returning with my camera. Just before photographing it, I took a closer look at this butterfly – it was beautiful. After I had taken a few pictures of it, I set down to do what was most important – observe the butterfly. Contradicting its natural behaviour of flitting around from branch to branch, this one was rather quiet and consistent in its perch, which left me in a quandary. I thought to myself probably it was gaining enough heat to facilitate its flight through the day. While I was contemplating reasons, I was distracted by a slight movement in a branch at the corner of the same plant. The movement was of another Red Pierrot. I looked around carefully among the branches of the plant and lo behold – there were two more Red Pierrots, quietly tucked away among the leaves where the soft morning sun rays were hitting them directly. In all there were four butterflies basking on the same plant.

When I saw those butterflies sitting on the leaves and without much motion, the picture was gradually becoming clearer to me. They had probably just hatched from their respective pupae and were drying their wings and basking in the sun in order to strengthen their wings for their future journey on this planet. The process of ‘mass basking’,

Unexpected encounter

as I would like to term it, had begun a little after 7:00 a.m. and drew to a close at about 10:00 a.m. At around this time, I watched the butterflies fly away one by one following which they chose to flit around in the neighbouring trees and plants.

Something which can be considered worthy of mention in this context is that during 'shooting' the butterflies, I had seen a dark coloured pupa hidden among the leaves and I had casually decided to photograph it in my photography spree. When I looked at the same pupa about forty-five minutes later, I was surprised to see that the colour of the pupa had changed from black to white. Though confounded, I dismissed it as a play of lights as the sun was now much higher in the sky and the place where I had clicked the pupa had considerably lit up. However, a closer scrutiny of the 'pupa' and as an afterthought it occurred to me that perhaps the black colour could be attributed to the black coloured upper part of the forewing of the butterfly, which was still inside when I had first seen it, and thereafter, what I had witnessed was the empty shell of the pupa, after the butterfly had emerged from it and abandoned it.

My excitement knew no bounds that day as the morning had been thrilling and action packed. However, the following morning awaited me with more surprises. I woke up early and after a quick cup of hot tea, hastened towards the kitchen window; this time armed with my camera for fear of missing out on any action, if any. I observed that like the previous day, there were two pupae that were black in colour on the leaves of the same plant and I kept a close vigil on them after clicking a few pictures of them. From my previous day's experience I knew that the black colour of the pupa indicated that they were ready for hatching. The sun was gradually rising and so was my

impatience with every passing minute.

And then the final moment came. The sheath of the pupa burst open from a corner and a tiny head started nudging its way out. I immediately switched on my camera and started 'shooting' pictures like I had never done before. I didn't want to miss any action as opportunities don't knock again and again. I followed every move of the butterfly very closely with my camera right from the moment it came out of its pupa case to the time when it felt its way around with its antennae and finally chose a branch to settle down for basking in the morning sun. The sun was gradually beginning to warm up the surrounding atmosphere, thus creating the right temperature conditions for the basking process.

Interestingly, the new born butterfly had its wings folded on both sides or best expressed if I say rolled up like a lady's hair bun. After breaking open the sheath of the pupa, the butterfly slowly emerged, felt its way out of the pupa with its antennae for sometime and then finally settled on the nearest branch, where it found a comfortable perch. It opened its folded wings and then began basking in the sun, just like its winged counterparts that I had witnessed the previous day, and occasionally rubbing its wings. The entire process of emerging from the pupa was completed in about three minutes. It was noteworthy that on this occasion and on several others, the process of hatching was always timed between 7:00 a.m. and 8:00 a.m., and it seemed that the surrounding temperature had a significant role to play in determining the time of hatching of these pupae.

I first saw these butterflies hatching in the flower pot on April 30, 2008, and from thence onwards began a nearly two month-long stint with these winged beauties till I witnessed the last of the pupae hatch on the 20th of July. Though unfortunately, I could never see the egg



Almost out



Totally emerged



Wings yet to unfold



Ready to fly

Unexpected encounter

stage of this butterfly, fortune shone on me when while looking through the leaves of the plant and trying to locate some more pupae, I chanced upon a small caterpillar of this butterfly, trying to burrow its way into a leaf. The caterpillar was of a pale yellowish white colour and a closer examination indicated dark spots on its body, which followed a definite pattern.

Owing to my proximity to the plant where it was breeding, I could frequently observe the whereabouts of the caterpillar. A voracious eater, the caterpillar cut through a small portion in the leaf and then settled inside it to feed. The extremely tiny cut in the leaf, which marks the entry point of the caterpillar into the leaf resulted in the little caterpillar going totally unnoticed. To an inexperienced eye, the leaf in which the caterpillar was in hiding would seem like any other.

The only clue indicating the presence of a caterpillar on the plant were the long, black trails, which it left behind after feeding. The trail, which I noticed on several occasions, consisted of small, black rounded objects, which clung to each other forming black masses. This was nothing but the caterpillar's droppings. While frequently monitoring it, I observed that this caterpillar remained inside a particular leaf and fed for sometime before moving on to another leaf. The process continued till I lost track of it and one fine day found that it had metamorphosed into a beautiful white pupa.

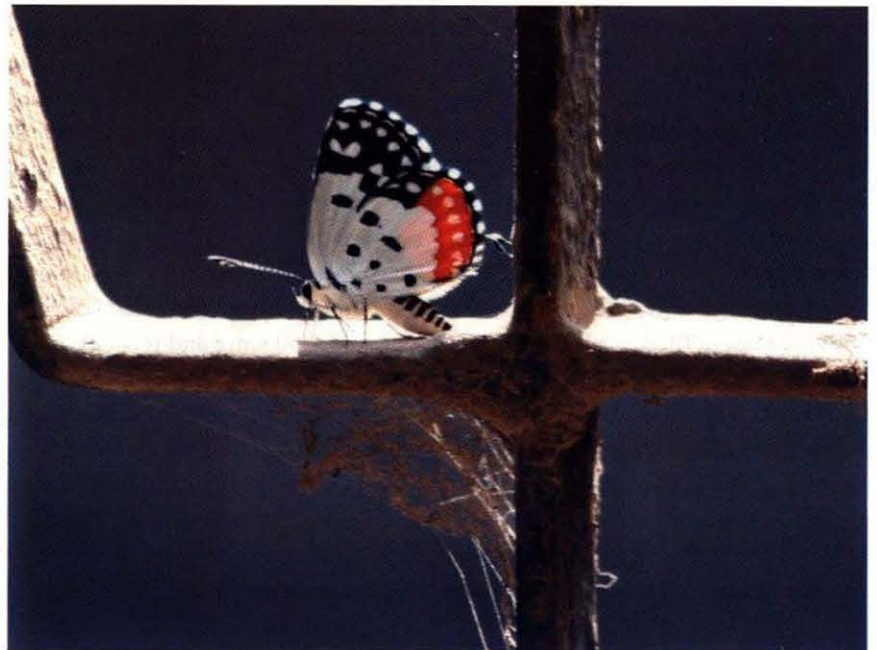
The pupal stage was markedly different from its larval stage (the caterpillar). The only remnants from its larval stage in terms of external features were its bristles, which continued even through this stage. These bristles became more prominent and pronounced during this stage. They were present all over the tiny body of the pupa along with regularly aligned

Red Pierrot *Talicaada nyseus* (Guerin-Meneville)

The Red Pierrot *Talicaada nyseus* belongs to the Family of Lycaenidae, commonly called Blues. It is a small butterfly with a wing span of not more than 3 to 3.5 cm. The upper side of its wings can be best described as inky blue colour with a striking and well contrasted prominent orangish red mark on the lower portion of its wings. The major portion of the inner wing is a silvery white marked with prominent black spots. The rim of its wing is bordered with black and orange. The outer circle, which is black, is marked with white blotches as well as fine white lines while the inner circle is a beautiful orange and also marked by white blotches. It is distributed across Sri Lanka, Southern India, Meghalaya, Assam, North Myanmar and is endemic to South and South-east Asia. In India, it is known to be widely distributed in Peninsular India. However, in recent times, the results of some scientific studies have revealed that these butterflies are on the way to making a new home in the foothills of the Himalayas.

The butterfly not being big in size has a weak flight and is generally found flying nearer the ground near plants and shrubs growing close to the ground. Its flight pattern indicates that it doesn't fly for very long at a time nor does it cover great distances. It is often seen to flit around for short distances, stopping to settle on a leaf or flower for a brief rest before taking off again. It is generally observed that while basking, they prefer shaded areas to open areas and hence, they are mostly found on the underside of leaves, where they cannot be easily sighted.

This tiny butterfly breeds usually in semi-arid conditions, patches of degraded evergreen as well as semi-evergreen forest regions, gardens, hill stations and forests. The availability of *Kalanchoe*, which is the principal food plant for this butterfly, is a critical determinant of its breeding ground. In regions where the *Kalanchoe* grows, the butterfly is known to breed at varying altitudes ranging from areas at sea level to about 8,000 feet (2,438 metres).



The tiny Red Pierrot seen soaking up some sun

black spots, not giving it a 'conventionally-pretty' appearance. This repulsive appearance is nature's way of discouraging birds and some insects chancing upon it as a potential meal.

While maturing into an adult from the pupal stage, there was a lot of colour variation within the latter stage itself. When I first saw it in its pupal stage, it was pure white in colour with prominent black spots on its body. These black spots, which followed a more or less definite pattern, ran from its head to lower tip in three columns. The middle column ran across its body from its thorax to lower tip while the remaining two ran parallel to the middle one on either side of its body. With days progressing, this white coloured pupa underwent some distinct changes in colour. From a colour that could be best described as pure white, it progressively changed into a dirty cream colour, which slowly turned steely grey and black on the under parts and minutes before hatching the colour of the pupa was blackish with the rings around the body becoming more distinct and conspicuous towards the final moments.

Compared to the larval stage, the body of the pupa was more clearly

defined and had distinguishable ring like segments starting from crown to tip. The ring-like segmentations became more prominent with each passing day. When the pupa was first formed, I observed that the pupa had a slight bulge on both ends of its body with one bulge particularly smaller than the other. However, with time as its body became well-formed, it was seen that the smaller bulge distinctly showed that it was the head of the to-be-born butterfly. The entire transformation from pupa to adult took about ten days while the process of transformation from egg to adult took roughly about 25-30 days.

In my brief spell with the Red Pierrot on this as well as on certain other instances, barring exceptions, I have rarely seen the Red Pierrot spread its wings and show its beautiful upper parts. It is commonly seen to sit with its wings folded, thus revealing its underside. As commonly viewed, the underside of this butterfly has some striking colours, which perfectly contrast with each other and makes one marvel at the genius and creativity skills of the Creator. The major portion of the wing is a silvery white marked with prominent black spots. The rim of the wing is bordered with black and orange.

The outer circle is black, and marked with white blotches as well as fine white lines while the inner circle is a beautiful orange and also marked by white blotches.

My unexpected encounter with this small and beautiful butterfly was not only enlightening and enriching, but also enabled me to accomplish a much desired wish of photographing it. But it was not without a price. The *Kalanchoe* plant, which I had fondly picked up from a nursery attracted by its small but beautiful star-shaped red flowers, had been close to my heart and I had tended it with great care. After the last butterfly flew away, all my excitement died down on the realization that the caterpillars had completely devoured the plant and left it in a sorry state with majority of the leaves eaten up. However, the recent monsoons were a consolation to me as they breathed new life into the plant and there were signs of new leaves growing back on the almost denuded plant and sooner than later, it will be ready to become the feeding and breeding ground for more Red Pierrots. ■



Kamolika Roy Chowdhury is an avid nature enthusiast and an amateur wildlife photographer.

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ASHOK CAPTAIN

Caecilians Decoded

Text: Varad B. Giri

I have been a researcher for the last one decade, and have believed that there is lot to be explored and discovered on this beautiful planet we call Earth. But the questions that have always bothered me are: do we really care to seek out the unknown animals of our world? Are we really doing enough for the life in our world? Do we, who proclaim ourselves as 'nature lovers', have the same awe for an ant as we have for a tiger? Yes, one represents an ignored and unpopular group while the other belongs to a charismatic and popular group. Interestingly, both have an equal and colossal role to play in the smooth running of the ecosystem. A

problem faced by either one can imbalance the entire food chain and ultimately the entire ecosystem.

After joining BNHS as Research Assistant in 1999, I started studying the specimens in the Collection Department. The first jars in the amphibian section confused me; the animal looked like something I had never seen earlier. At times it looked like a snake and at others it looked like a large earthworm. This was the time when I was still not 'exposed' to the real world of taxonomy, and scientific names to me were words of an 'alien' language. The jar was labelled as *Ichthyophis bombayensis*. What was this: a

snake, lizard or some other animal? When I looked up literature, I realized for first time that it was a legless amphibian, commonly called 'caecilian'. When I tried to read more about them, I learnt that not much is known about these creatures. The next question was, why?

If there are questions, then there have to be answers; this I believe is the real force behind all discoveries and inventions. I have always followed one of the best teachings of my father: do not believe until you are convinced. I have practiced his teaching and have realized that our inquisitiveness is always answered with proper and persistent

efforts. Many a times the answer itself is another question and the cycle goes on ... My experience in the field of herpetology is limited, and the more I learn, the more I realize my ignorance. It is this ignorance and curiosity that has pushed me to explore these hidden gems – caecilians! Believe it or not, it is a very different and amazing world.

At BNHS we have student visitors, from various schools, colleges and universities, mostly studying zoology. When it comes to giving examples of amphibians most cite frogs and toads, a few add salamanders and newts, but unfortunately the list ends here. When asked about caecilians, many students, and sometimes even faculty are unaware about caecilians. This is proof enough on the level of ignorance about limbless amphibians. I am not surprised; as this has been carried over the years by everyone.

These secretive creatures were first 'unearthed' by Seba in 1735. Interestingly, he considered them as snakes. Later in 1754, Linnaeus, who is considered as father of taxonomy, also included them among snakes. Though they superficially resemble snakes, caecilians have no scales on their skin like most reptiles. Then what could this creature be? This question was solved by Oppel in 1811, who for the first time considered them as amphibians. But the ambiguity continued and it was thought to be a degenerate Salamander. Finally, after 1908, after detailed anatomical studies, this misunderstood creature was properly identified as a real amphibian.



Gegeneophis danieli, one of the endemic caecilian species of the Western Ghats

In simple words, caecilians are elongate, limbless, primarily burrowing amphibians, some of which are secondarily aquatic. Apart from this, these amphibians are unique in having annuli on their body and presence of tentacles, a character not seen in any other vertebrate. Because of their burrowing habits and moist skin, these amphibians are habitat specific, and thus have pantropical distribution. These exceptional amphibians are found only in Central and South America, Africa, Seychelles Islands, India, Sri Lanka, Thailand, Cambodia, Sumatra, Borneo and Philippines.

Though they have restricted distribution and habitat preference, they are diverse. There are six families and 176 known species of caecilians in the world. India is also rich in diversity of caecilians. There are 27 described species of caecilians belonging to three families Ichthyophiidae, Uraeotyphlidae and Caeciliidae in India. As per present knowledge, 22 species are endemic to the Western Ghats and the rest are known from north-east India. Thus,

from distributional records it is apparent that the hot spot of known caecilian diversity in India is the Western Ghats.

They not only show diversity in numbers, but also in size. With a length of 51 mm, *Idiocranium russeli* is the smallest caecilian in the world, and the largest is *Caecilia thompsoni* from Columbia, which grows to a length of 1,515 mm. The smallest Indian caecilian is *Gegeneophis krishni* and it grows to about 142 mm long and at 630 mm the longest is *Ichthyophis bombayensis*.

The smaller caecilians superficially resemble earthworms due to rings on the body. But they differ from earthworms in having eyes, teeth, tentacles and skeleton. At times the larger ones look like snakes, but differ in lacking external scales. This could probably be the reason why they were misunderstood for many years.

Due to their burrowing nature, very little is known about the natural history of caecilians. With the available information it can be concluded that they are generally solitary. They are



Ichthyophis bombayensis – the largest caecilian in India



Gegeneophis krishni – the smallest caecilian in India

Caecilians



JOHN GOWER

Caecilians are burrowing animals and are mostly seen under rocks

mostly seen in loose, wet or moist soil, among moist leaf litter, under rocks and logs, many a times near perennial source of water, and a few are aquatic too. Preliminary studies conducted on some terrestrial caecilians proved that they prefer acidic soil, rich in humus and organic matter. Altitudinal distribution is also quite interesting as they are known from coastal areas to altitudes of about 2,500 m above msl. But my observations on caecilians indicate that they have a wide array of habitat preference and a detailed study on different species is essential.

Like most amphibians, their skin is smooth, slimy due to mucous secretions. The uniqueness of caecilians is the presence of scales

below their skin. Though these scales are not visible from outside, there is a series of scales below the skin. Like most amphibians water is an essential component of their life cycle. If exposed for long, they become dry and inactive. Thus, they are mostly active on rainy days. They form tunnels in soil with the help of their strong head. These tunnels open out as small holes on the surface of soil, which are mostly hidden among leaf litter. It is difficult to identify these tunnels or openings from outside. The inner surface of these tunnels is coated with mucus, secreted by the skin of the animal itself. It is not uncommon to see them emerging out of their burrows and wander at night in search of food or

mate, and in doing so they are run over by vehicles.

Caecilians are carnivorous and most of them are opportunistic feeders. Based on the available information the 'menu' of caecilians contains earthworms, termites, larvae and pupae of a variety of insects. Some have observed them feeding on dead and decaying organic matter.

Most of the caecilians are oviparous, i.e., they lay eggs, but a few are 'live bearing'. A strong parental care is observed in caecilians. The female after laying eggs coils around the egg clutch in an egg chamber and strictly guards the eggs. The number of eggs depends on species and size of the female. Females when on maternal duty are mostly seen on the sides of the streams or near very damp places. After hatching, if the larvae are aquatic, they enter water; these larvae have external gills, and dorsal and caudal fins. But in case of terrestrial ones it is observed that the larvae burrow into the loose soil nearby. They lack external gills and caudal fins. Though these larvae resemble adults, their head is generally round and mouth terminal. Interestingly, their eyes are visible.

I was always anxious to learn more about caecilian's lifestyle and how they manage it? How do they live in 'hostile' habitats? But, a close look at them and one could get answers to all the questions. Their burrowing habit must be comfortable because of the snake-like elongated body and lack of limbs. Now, can you imagine digging in soil without using hands and legs? Sounds difficult? But for caecilians it is an easy task. They use their bullet-shaped head, especially designed so for burrowing. This again is possible as their skull is made up with compact bones and the skin above is tightly attached to these bones.

The eyes are poorly developed in caecilians. In some terrestrial and

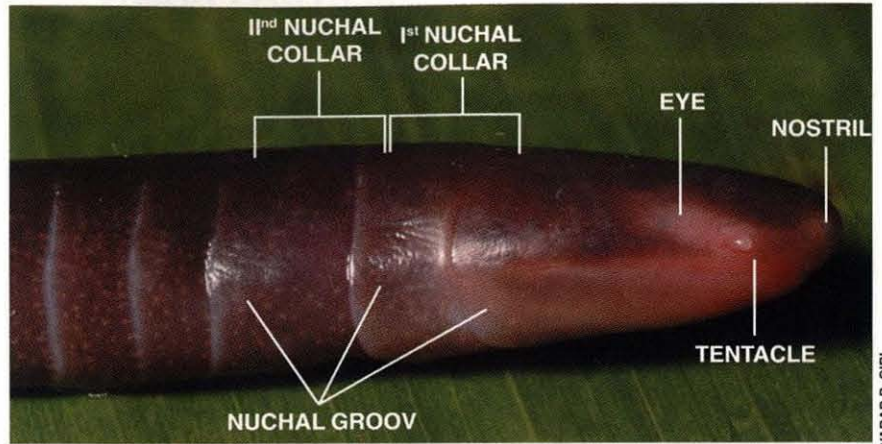


VARAD B. GIRI

The caecilian's bullet-shaped head is an essential tool for burrowing

aquatic forms they are comparatively visible, but in burrowing forms they are hidden under skin or skull bone and merely visible as dark pigmented spots. Then how do caecilians communicate? Caecilians have to largely depend on sense of smell for communication. Also, in nature every 'failing' is 'compensated' in one way or the other. The other sensory organ, that makes caecilians unique among the vertebrates is the 'tentacle'. These tentacles are retractile or conical and are mostly placed between the eye and nostril. Their main function is to carry chemical messages from the surroundings to the nasal cavity.

To feed on a slippery animal like earthworm must be a difficult task. Then how do caecilians manage this? Like snakes, caecilians are also provided with a number of teeth in their jaw. There are two series of teeth in the upper and lower jaw. These teeth are with sharp edges and are incurved, which are mainly used for catching their prey.

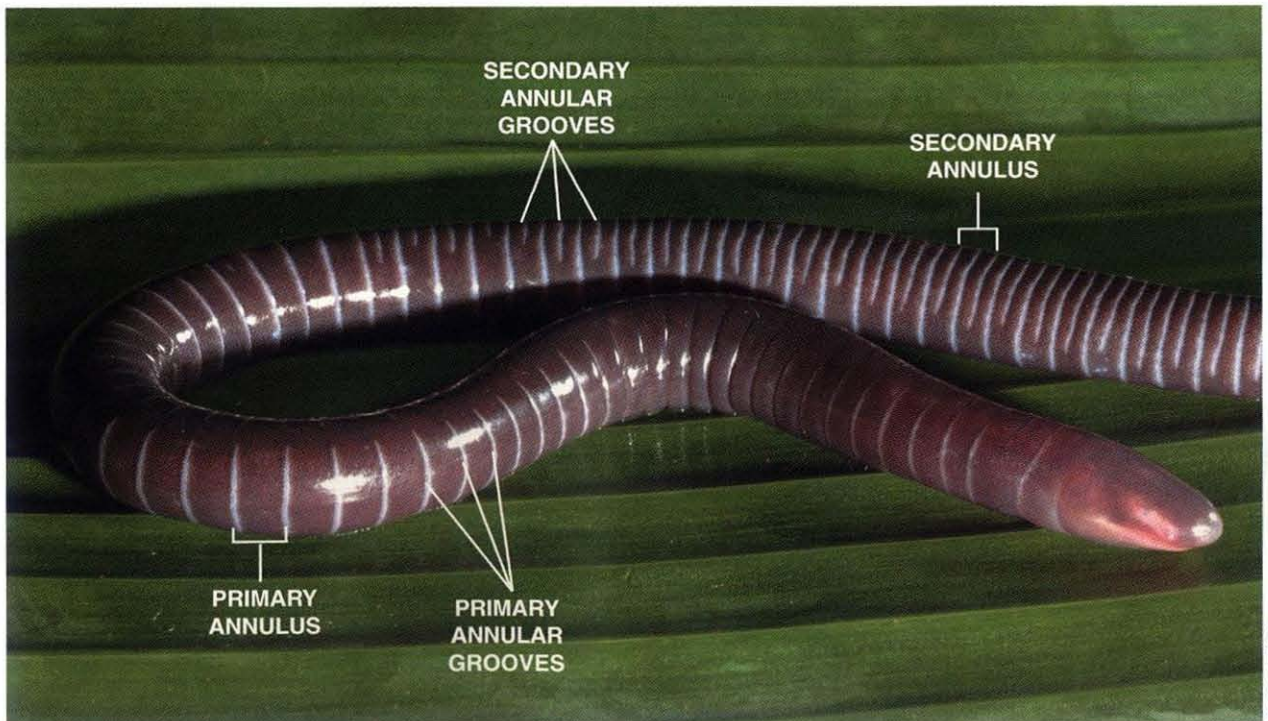


Morphological characters on the head and neck of a caecilian

The body of caecilians is externally segmented by rings or grooves and this is another unique morphological character. There are three grooves on the neck region and these are called 'nuchal grooves' and the portion between them is 'nuchal collar'. The grooves on the body are called annular grooves and the portion between two consecutive annular grooves is called 'annulus'. These annuli start from behind the head and continue throughout the body. In some species these grooves are closely spaced so the

annuli look compact and indistinguishable. In others the grooves are widely spaced and annuli are easily distinguishable. Based on their occurrence they are differentiated as primary and secondary annuli. The primary annuli begin just behind the head and they continue till the end, while the secondary annuli lie between two primary annuli, mostly starting at or after the mid-body and continuing to the end.

(see photo below)



Morphological characters on the body of a caecilian

Caecilians

In some caecilians there is a short and slightly compressed tail and the cloacal aperture is vertical. This character is mostly seen in the species with aquatic larval form. In others, which are mostly burrowing forms, the tail is absent and the cloacal aperture is transverse.

One of the impediments of identifying caecilians is their taxonomy. For me too it was difficult in the beginning. When I met Dr. Mark Wilkinson and Dr. David Gower, caecilian experts from the Natural History Museum, London, I realized it was not so difficult after all. They taught me caecilian taxonomy in detail and I am still in the process of learning.

In caecilians there are not many distinguishing morphological characters that govern the taxonomy as their body is cylindrical and there are no limbs. So, how does one differentiate one species of caecilian from another based on these limited characters? Look closely at the caecilians; the main distinguishing character in caecilians is the annuli on the body. As mentioned earlier these annuli are of different types, look closely for their number and arrangement. Another character to observe is the position of eye, tentacle and nostril. The presence or absence of tail is also an important character. And though it sounds difficult, the number of teeth is also used for identifying caecilians. Thus, caecilian taxonomy, though difficult, is easy and not complicated as mentioned historically.

The Indian caecilians were overlooked for years, however, moderate recent efforts in most of the Western Ghats uncovered several new species. This is the best indication that we are still unaware of the real diversity, biology and natural history of caecilians in India and due to lack



ASHOK CAPTAIN

Short and compressed tail with vertical cloacal aperture



VARAD B. GIRI

No tail with transverse cloacal aperture

of this knowledge all of them are at present of data deficient conservation status.

The interesting mode of life cycle of these amphibians makes them prone to change in the environmental conditions. Thus, pollution from fertilizers, habitat degradation, deforestation, change in rainfall pattern and rise in global temperature is going to affect these amphibians. They are the 'indicators' of a healthy environment.

At BNHS we are conducting surveys to study the present status of caecilians of the northern Western Ghats. This project is funded by 'Declining Amphibian Population Task Force', 'Ruffords Small Grants' and the 'Ministry of Environment and Forests, Government of India'. This survey has already resulted in the discovery of two new species of caecilians and many interesting findings about these hidden gems. I feel that more focussed efforts are needed to learn about these hidden amphibians.

As per the recent reports about 31% of the amphibians of the world are on the verge of extinction. Interestingly, all the caecilians are considered data deficient, means we are not aware about their status. This is really an alarming situation. Many more species are yet to be discovered and if the situation remains the same then they will be extinct before we discover them. Although hidden, they are equally essential in the ecosystem. Henceforth, try and look for these hidden gems wherever you go, they also deserve your attention. ■



Varad B. Giri is presently the Curator, at the Collection Department, BNHS. He is studying the Caecilians of Northern Western Ghats for the last seven years.

CAECILIAN FACT FILE

Family: *Ichthyophiidae*
Genus: *Ichthyophis*



Annuli closely spaced



Tentacle between and below eye-nostril line



Tail present

Family: *Uraeotyphlidae*
Genus: *Uraeotyphlus*



Annuli closely spaced



Tentacle below nostril



Tail present

Family: *Caeciliidae*
Genus: *Indotyphlus*



Annuli sparcely spaced



Tentacle on a line between eye and nostril



Tail absent

Family: *Caeciliidae*
Genus: *Gegeneophis*



Annuli sparcely spaced



Tentacle between and below eye-nostril line



Tail absent



Sloth Bear

Bears can be found almost all throughout the world except Africa and Antarctica. They have been on earth since 40 million years. The fossils of the earliest known bear *Ursavus elemensis* was found in Miocene Epoch in Europe. This animal was small, the size of a dog and all the modern bears are known to be the descendants of the *Ursavus elemensis*. Bears are classified as carnivores, with each species having a variable degree of herbivorous tendency.

The Sloth Bear *Melursus ursinus* belongs to the family Ursidae, which includes all the eight species of bears. The Sloth Bear is small and usually black with long shaggy coat. Brown and grey hair may be mixed with the dark coat, cinnamon and reddish individuals have also been reported. It has a distinctive whitish or yellow chest patch in the shape of a wide 'U' or 'Y'. The snout is light coloured and highly sensitive.

Sloth Bear is chiefly found in forest and forest openings, and very few are found in grasslands. It favours drier forest areas with rocky outcrops. The Sloth Bear is found in India, Sri Lanka, Bangladesh, Nepal and Bhutan. Mating occurs between December and January. The Sloth bear is a solitary animal, except the females with cubs. They feed extensively on termites and have special adaptations for doing this. The naked lips are

capable of protruding and the inner pair of upper incisors is missing, which forms a gap through which the termites can be sucked. The sucking noises made by feeding in this manner can apparently be heard from over 100 metres away. They also eat fruits, other insects, honey and various kinds of vegetation.

Sloth Bears are killed by farmers as they damage their crops and are also hunted for their prized gal bladders, which are used in medicine in Asia, especially China. The dried gal bladder of a Sloth Bear fetches thousands of dollars in the international market.

Bear bile is believed to cure a lot of ailments like cirrhosis of liver, jaundice, high blood pressure, diabetes, heart diseases, tooth decay and eye infections. This belief is, however, not scientific and is misleading. There are about 8,000 Asiatic bears and various other species in the bear farms in South-east Asia today. Bear paw soup is considered a delicacy in the Chinese restaurants.

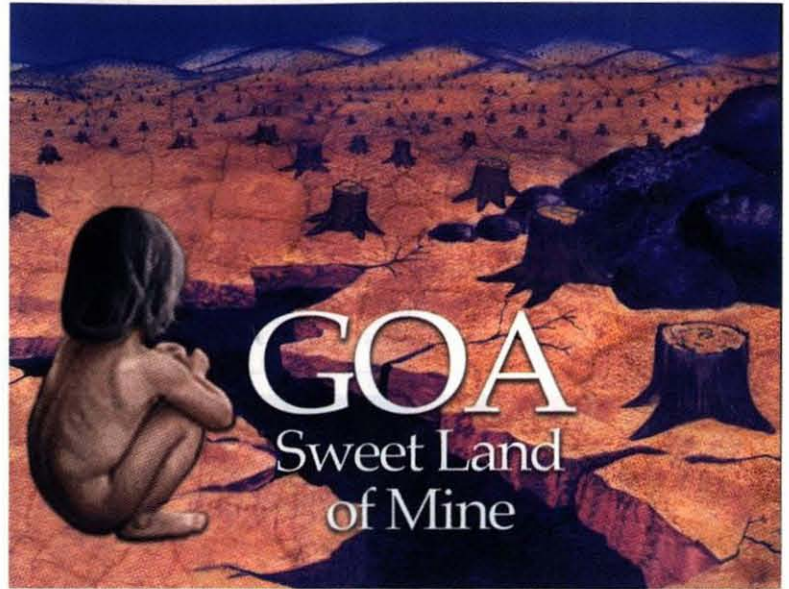
In fact, the bears world over are under tremendous pressure and their numbers are decreasing. The loss of habitat, man-animal conflicts, their use in entertainment as dancing bears in Asia and Europe, bear baiting in Pakistan and use in Traditional Chinese Medicine (TCM) and food in countries like China, Korea, are responsible for the decline in the bear population. ■

Reviewed by Asad R. Rahmani

How does one review a book written by environmental activists in “anger and rage”? Well, I presume the reviewer will have to be objective and dispassionate, which I shall try to be.

Goa, a paradise for tourists – this is the impression that is created by the media and government. Unknown to most tourists (but known to most Goans and government *babus*), the innards of Goa are being ripped apart by the politically strong mining lobby. What conservationists metaphorically call ‘rape of Earth’ is happening in Goa.

Goa is considered a modern state with a high literacy rate, and a play-ground of the bold and beautiful; but as far as mining is considered, it still follows “primitive operations of robber barons”, as Claude Alvares has succinctly put in the first paragraph of his book. We all know that open cast mining is one of the most destructive forms of industrial activity in the world, and is being increasingly replaced by ‘room and pillar’ extraction, which does not envisage destruction of forests or destruction of nature on the surface (except in a limited area). But, in the tiny state of Goa, there are more than 40 open cast mine leases, many operating inside protected areas! Most of them have been ostensibly approved by the Ministry of Environment and Forests (MoEF), Government of India. Incidentally, the mandate of the MoEF is to protect wildlife and forests. Majority of the forests with permission for mining have in fact already been notified as ‘reserve forests’. According to this book, the MoEF has further cleared 70 mining projects during the last two years. They would require further destruction of forests, both private and reserve. These mines are owned by rich and politically connected people; so, any step to halt them is crushed by the mining mafia with the support of politicians. Nevertheless, Goans have increasingly objected to the destruction of their forests and natural resource base, but who can confront corrupt politicians and conniving *babus* who know how to circumvent laws.



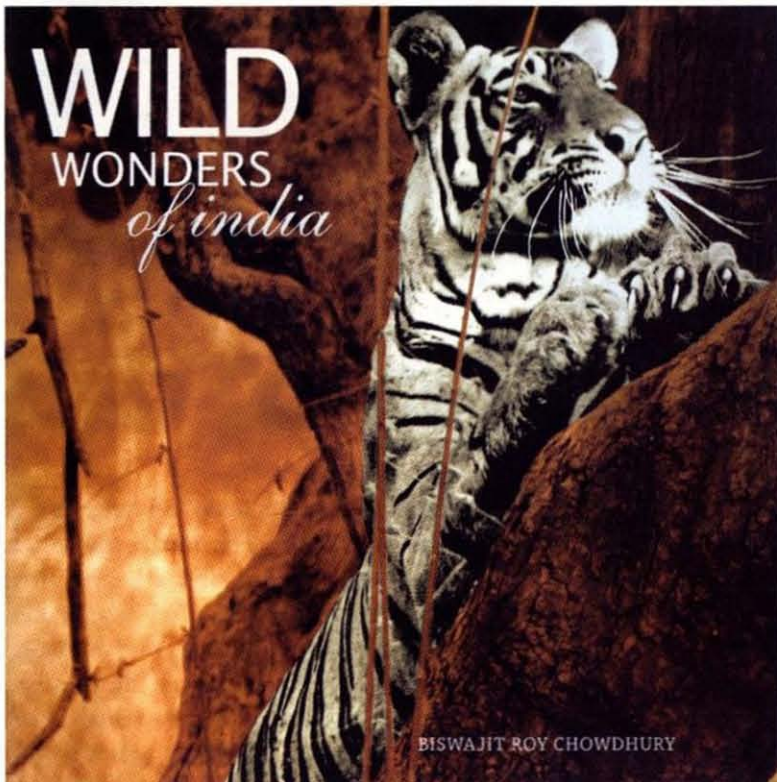
P **GOA: SWEET LAND OF MINE** Edited by Claude Alvares and Reboni Saha. Published by Goa Foundation, Goa. Size: 28cm x 21cm, Pp. 92. Price not mentioned. Paperback

Goa is located in one of the biodiversity ‘hotspots’ of the world, i.e., the Western Ghats. The forest of Goa is a treasure trove of biological diversity, with new species being discovered regularly. For example, in July 2006, a new species of legless amphibian was discovered in the Mhadei Wildlife Sanctuary and named *Gegeneophis mhadeiensis* after the river Mhadei. Other species of amphibians discovered from the forests of Goa (and adjoining Karnataka) are *Gegeneophis nadkarnii* from Bondla Wildlife Sanctuary, *Gegeneophis madhavaorum* from Mookambika Wildlife Sanctuary in Karnataka, and *Gegeneophis goaensis* from Sankli-Kheri. One would think that with such rich biodiversity the Goa Government would protect the remaining forests and other habitats. Instead, the Goa Government has tried its best to denotify Netravali and Mhadei wildlife sanctuaries to allow mining. These two were declared as sanctuaries in 2000 during the Governor’s rule. Incidentally, two BNHS members and the Goa Foundation played a major role in getting these sanctuaries in the protected area network. With the notification of these two protected areas, the entire eastern coast of Goa became a continuous protected corridor.

The book is full of pictures and data. I congratulate Claude Alvares and the Goa Foundation for bringing out such a forceful book. The design and layout is well done by Aniruddha Sen Gupta. In some sections, pamphleteer's language is used, but perhaps that is only a desperate way of conveying the message, loud and clear, especially when one knows, no one is listening. I hope the Goa Foundation will be successful in its mission

and destructive open cast mining, as depicted in pages after pages in this book, and also on the enclosed map, will one day stop.

After reading this book and seeing the pictures, I must say that I am also in rage. Who would remain unmoved? I am sure no right thinking, concerned Indian would remain unmoved after learning what is happening in Goa. ☹



WILD WONDERS OF INDIA, by Biswajit Roy Choudhury. 2008. Niyogi Books, New Delhi. Size: 23cm x 23cm, Pp. 152. Price not given. Hardback

Reviewed by Asad R. Rahmani

Biswajit Roy Choudhury is a naturalist, traveller, writer and photographer. He is the founder of Nature Environment and Wildlife Society, and editor of the magazine – *Environ*, which is well-known for its brilliant pictures and interesting articles. This is Choudhury's eighth book.

The book is profusely illustrated and the text is simple, and in places pedantic, but full

of information. However, some information is incorrect. For example, there is neither Bishnoi settlement, nor Blackbuck and Grey Wolf in the Desert National Park. The cacti are basically of New World origin and not found naturally in the Park. The caption of a picture showing tall Pine trees reads "An Alpine forest" (p. 130). An alpine region generally does not have forests! The word 'endemic' is wrongly used in many places. The Marbled Cat (p. 60) cannot be considered endemic to north-eastern India, as it is found further east in Myanmar, Thailand and SE Asia.

The picture quality varies from excellent (e.g., Tiger, p. 96) to good (e.g., Gharial, p. 39) to ordinary (e.g., Green Whip Snake, p. 117). Some pictures are out of focus (p. 50, 126-127) while many appear to have been taken in a zoo (e.g., Wolf, p. 29; Mallard p. 48; Couledd Leopard, p. 58, 76). Some pictures are interesting, for example, the seldom-photographed Himalayan Salamander (p. 79), and a python coiling an unfortunate peafowl (p. 103). Most pictures are taken by Choudhury himself, but the rest are contributed by fifteen other photographers. Unfortunately, the photographer's name is not mentioned alongside the picture making it tedious to identify the photographer.

On the whole, the book is useful for the general public who want to know basic information about Indian wildlife. The colourful pictures will keep their interest. After reading the book, if more people start caring for wildlife, the purpose of printing this book will have been served. ☹

THESE BOOKS ARE NOT AVAILABLE FOR SALE AT THE BNHS

Rescue and Rehabilitation of A Large Endangered Python

A full grown adult Indian Python *Python molurus* was rescued and rehabilitated by the members of Green Heart Nature Club (GHNC) in cooperation with the staff of Charalkhola Wildlife Beat Office under Wildlife Division, Kokrajhar, Assam.

On July 5, a villager of Pundibari village, working in a paddy field, saw a large python, about 13 feet long, in the muddy field adjacent to the Chakrasila Wildlife Sanctuary. The frightened villager mustered all his courage and with the help of villagers caught the snake with a jute rope without hurting it. They brought it to the village for safety and contacted the Green Heart



Nature Club office, Kokrajhar to take necessary actions to save the python.

Members of Green Heart rushed to the spot after informing the forest officials in Kokrajhar and discussed the matter with local ABSU members of Nayekgaon Anchalik and with the villagers for safety, protection and proper release of the rescued Python. The Python was later brought to the Charalkhola Wildlife Beat by the Beat

Office Staff and villagers for safe custody. Following a preliminary check-up the python was released inside the Chakrasila Wildlife Sanctuary by the members of the Green Heart under the strict supervision of a Veterinary Surgeon.

The Python had probably come down from the Chakrasila Wildlife Sanctuary to the paddy field with torrential flow of the rain water. Pythons are found almost every year during monsoon in these areas from Bahalpur to Chakrasila Wildlife Sanctuary and Nadandgiri Hill Reserve Forests. Such incidents are now common due to rapid deforestation in the hill areas and encroachment of forest land adjacent to the hills.

Bablu Dey, Kokrajhar.



Did you know?

With Dracula, a few cases of rabies, their pointy teeth, and the fact that they hang upside down to sleep, bats inspire fear in many people; it isn't easy being a bat. But bats are amazing creatures, even though they eat bugs and prowl in the night. . .

There are a couple of reasons why bats roost in an upside down manner. First of all, it puts them in an ideal position for takeoff. Unlike birds, bats can't launch themselves into the air from the ground. Their wings don't produce enough lift to take off from a dead stop, and their hind legs are so small and underdeveloped that they can't run to build up the necessary takeoff

speed. Instead, they use their front claws to climb to a high spot, and then fall into flight. By sleeping upside down in a high location, they are all set to launch if they need to escape the roost.

So how does it manage to hang on? To get the talons to grab hold of the surface, the bat simply lets its body relax. The weight of the upper body pulls down on the tendons connected to the talons, causing them to clench. Since the talons remain closed when the bat is relaxed, a bat that dies while roosting will continue to hang upside down until something (another bat, for example) jostles it loose. ■

About the poster



Pied Harrier (male) is a slim and elegant long-winged raptor of contrasting black and white plumage. The female, on the other hand, is brown above with whitish belly and may be confused with other female harriers in field. The bird's description and its habits are best given in Sâlim Ali and S.D. Ripley's *HANDBOOK* published by Oxford University Press, the Bible of Indian ornithologists.

"Single birds spend the day quartering the country side meter or two above the ground sailing lightly and gracefully on outspread motionless wings, banking to skirt a bush. 'Dipping to the hollow and rising to the mound' or skimming the tops of standing crops or grass. From time to time the bird checks, dead in its flight wheeling almost double upon itself, swinging out its legs and pouncing noiselessly on some unsuspecting quarry. If successful it alights to dispose off the victim on the spot before resuming the beat. When sated, rests on the bare ground or on a clod or mound in preference to a bush or tree. Roosts at night in the open, often in sizeable congregations and in company with other Harrier species in a ploughed field, fallow land or grassy swamp. The birds do not sleep huddled together but sit dotted about individually a few meters from one another, sometimes in a pressed form in grass as made by partridges."

Pied Harrier (male)
Circus melanoleucos



Caracal: A cat that stole the show

Text and Photographs: Dharmendra Khandal

Seeing a caracal is a reverie for researchers, dream of wildlifers and an ultimate fantasy of photographers. Many species like the Snow Leopards or Red Panda are equally hard to see. To see a Snow Leopard one has to climb the tall Himalayan mountains in freezing temperatures, while to see a Red Panda one has to overcome the nasty rains and various hurdles associated with a rain forest. Geographically, the areas inhabited by the Caracal are easily approachable, and are a part of the main tourism hubs of India such as Ranthambhore and Sariska. Thousands of tourists, hundreds of vehicles go in these areas every day, yet the caracal remains ever elusive. Some consider the sighting of Caracal as God's grace, while others as luck. Researchers, wildlifers and photographers know that it is not just a matter of persistence or resolute; the caracal is seen only by those whom the caracal wants to see.

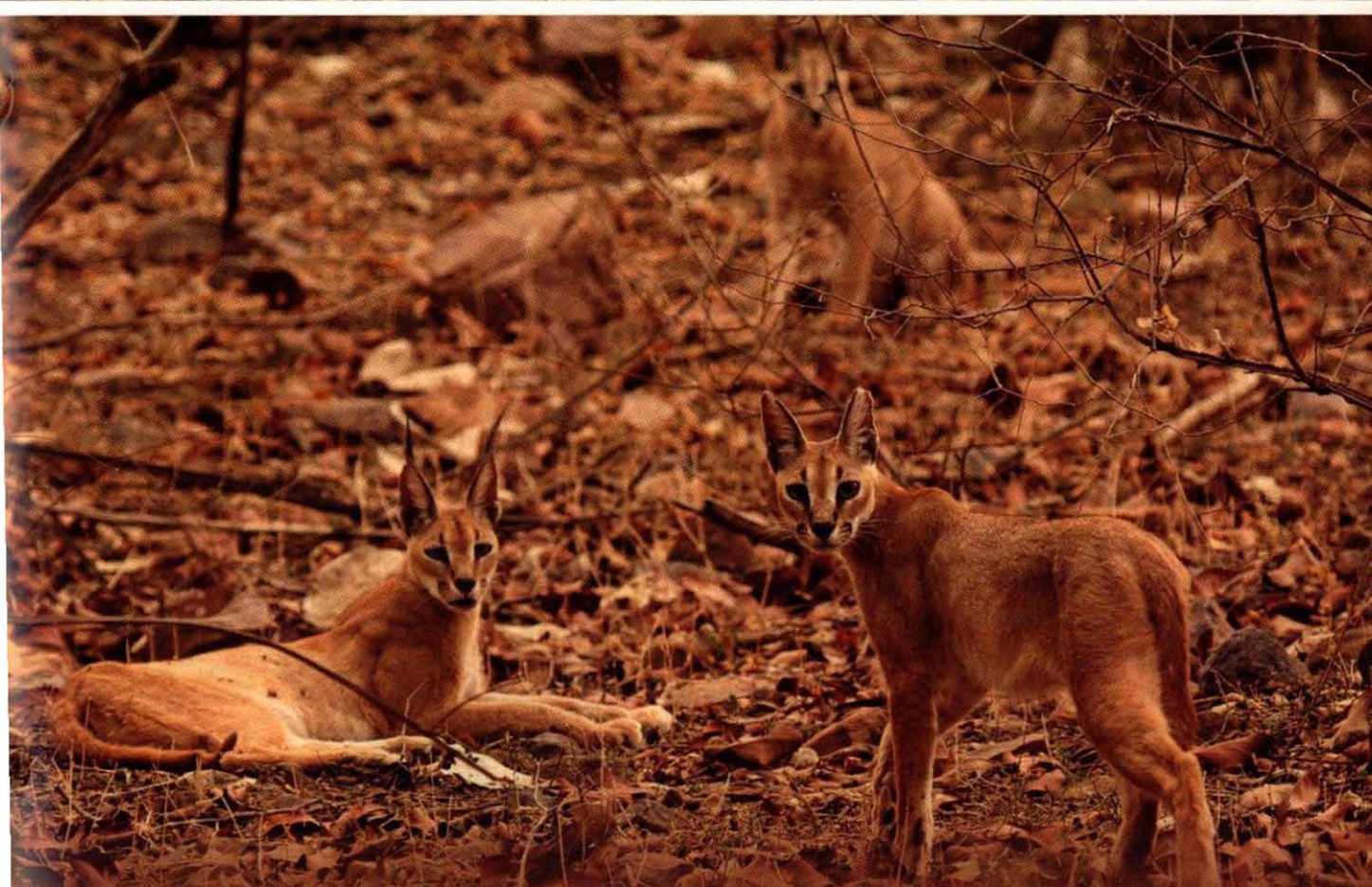
Recently, I had a fantastic sighting of Caracal family with a kill, after six years of my stay in Ranthambhore, a long wait ... the mysterious creature finally showed up!



The word Caracal is derived from the Turkish word *karakulak*, which means "black ear". Caracals are known and called by many names; known as 'Siyeh gush' in Persian, and as 'Mor mar Bhageri' in Rajasthani. Kutchi, a dialect of Gujarat, has a name for it, 'Harnotro' meaning haran (Chinkara) like colour. The scientific name of Caracal is *Caracal caracal*.

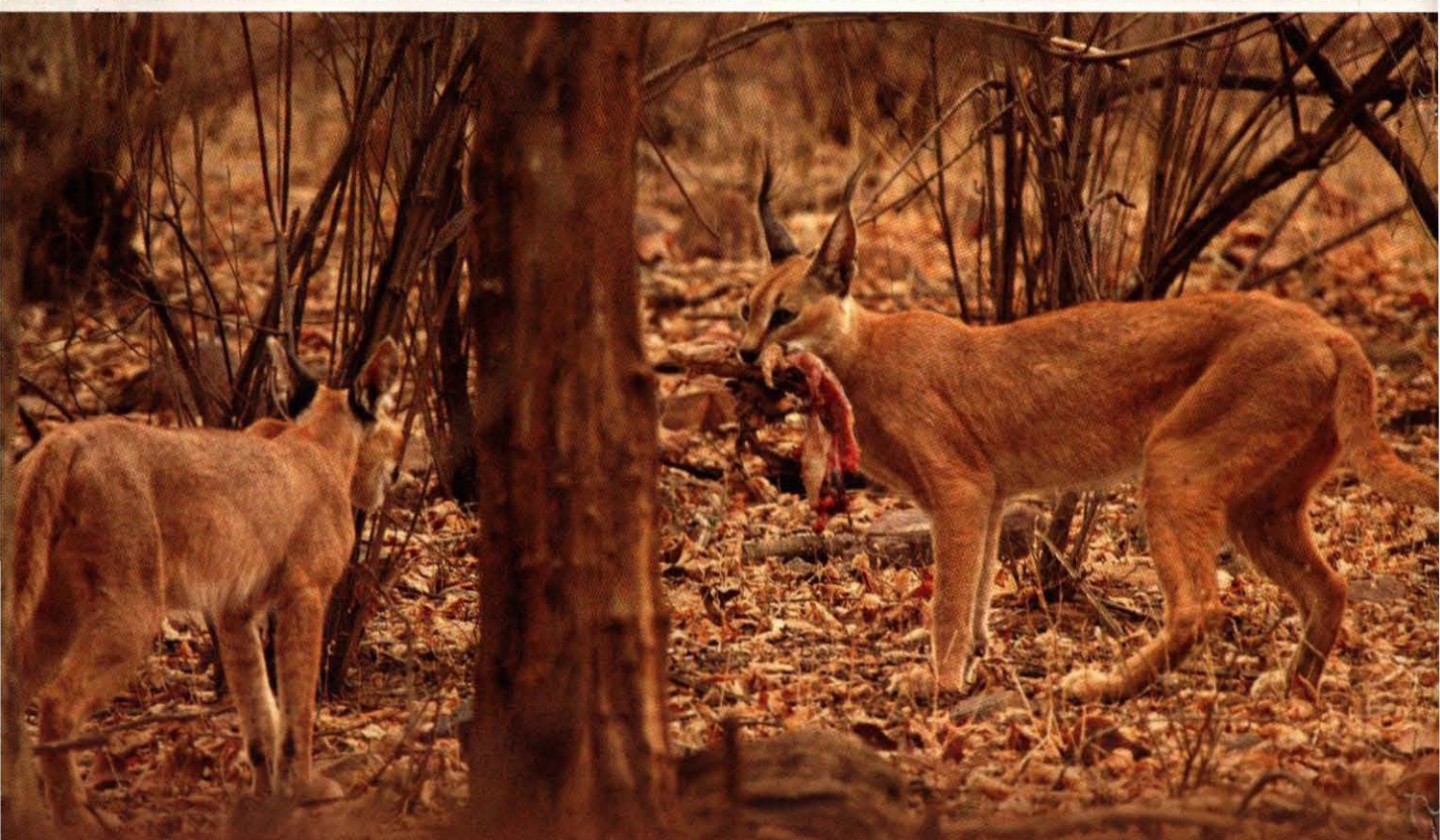
Caracal is a medium sized cat. It is generally dark red, grey, or golden sand in colour, and as the name suggests, the Caracal possesses a very unique distinguishing physical feature; its ears are long, narrow and tipped with long tufts of black hair on top of each ear.

The Caracal's hind legs are longer than its front, which helps it to leap in the air. All the paws are wide, and well padded, to help its movement remain quiet in grass, or to walk in deep snow. Each paw also ends in four retractable claws, which are four to five nail's breadth in length. They are capable of tremendous aerial acrobatic jumps and can land safely. Caracals have the claim to fame of being the "*fastest of all the small cats*" and have been known to leap up into the air to successfully catch and kill flying birds.



The incredible sighting of the Caracal happened in the Pilli Ghati area of Ranthambhore, it was a cloudy day, I was in a gypsy, when out of the blue we saw a caracal walking along the road and entering the bushes, before the dawn of realisation and the resulting elation hit us we saw two more caracals near the road, raising the total to three caracals!! It was a rare sighting of caracal with two full grown cubs. By now they had entered the bushes, but we could still see them. The dry deciduous forest enabled us to see the animal in the bushes till quite a distance.

They were about 50 m from the road, but walking parallel behind the bushes. Since pictures could not be taken in such a circumstance I had lost hope, but we kept walking together, the caracal and the gypsy for the next 200 m. We parked our vehicle in an open place, one cub and the mother started coming close to us. At about 6 m they started searching for something in the bushes, now the mother sat on one side. The cub finally succeeded in searching, it was a 'gargantuan-sized' Monitor Lizard.



The first cub came ahead and curiously kept looking at the kill, it flipped it from one side to another as if playing with it. The mother kept looking at the cub, with less amusement of course. She kept ignoring us all together. The cub by now was trying to tear the Monitor Lizard, but as it is a thick skinned reptile it did not succeed and left the lizard. On getting inquisitive and wondering as to why they were eating the Lizard (which they didnt kill in front of us) our vehicle driver Raees Khan whispered, "the mother must have killed and left it here, later she went and brought the cubs to the kill." This observation is perhaps his 25 year-experience... soon the second cub came in, this cub had one ear cut from top. This one finally managed to tear open the Monitor Lizard, but it took him almost 30 minutes to open the prey; it devoured nearly half of it.

It left the half eaten kill, and now the first cub came back; but the mother came ahead and she took away the kill and then disappeared in the bushes followed obediently by the cubs. The whole episode lasted for about 47 minutes, starting from my first picture to last picture ... I took a total of 460 shots of this rare beauty in the given time.



In India Caracal is reported in Ranthambhore, Sariska, Kutch and Chambal. Like the Tiger, Caracal also has nine subspecies, viz.:

1. *Caracal caracal caracal*, East, Central and South Africa
2. *Caracal caracal algira*, North Africa
3. *Caracal caracal damarensis*, Namibia
4. *Caracal caracal limpopoensis*, Botswana
5. *Caracal caracal lucani*, Gabon
6. *Caracal caracal michaelis*, Turkmenistan (endangered)
7. *Caracal caracal nubica*, Ethiopia, Sudan
8. *Caracal caracal poecilotis*, West Africa
9. *Caracal caracal schmitzi*, Israel, West Asia, Iran, Arabia, Pakistan, India

Distribution: Caracals are native to Africa, Asia, and even certain areas of the Middle East. In India, it is reported in Ranthambhore (Rajasthan), Sariska (Rajasthan), Kutch (Gujarat) and Chambal (Rajasthan and Madhya Pradesh). Late Dr. Ishwar Prakash, Director, ZSI, reported a caracal from Bikaner district.

Other than the Cheetah the caracals were the only other feline which were used by the Moghul's for hunting. Interestingly, the Caracal couldn't influence art and culture like tigers and lions, because of its elusiveness.

Dr. V.D. Sharma, former PCCF of Rajasthan stated, "Caracal being elusive does not mean that it's not hunted; in 1982- 83 two caracals skin were recovered in Pali district of Rajasthan from the Jogi community."

In Africa, Caracal is poached and its skin traded. The skin is put for sale on the internet without inhibitions.

However, the most important factor leading to the endangerment of the Caracal is the human impact on the habitat of the species. As human-use of resources and space has amplified over years the habitat of the Caracal has shrunk considerably. We have to act rapidly to save this secretive and enchanting cat species.



Dharmendra Khandal, Ph.D is currently working as a Conservation Biologist with a Non Profit Organization 'Tiger Watch'. His work profile consists of Anti-poaching operations, traditional poacher community 'Mogya' Rehabilitation. He has done extensive work on Spiders of India.

**SPECIAL
OFFER**

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By Ashok Kothari & B.F. Chhappgar

Living Jewels from the Indian Jungle, the name says it all! Thrill your senses with real life shikar experiences, interesting episodes culled from rare books and old issues of the *JBNHS!* Many of these episodes were written when most of India was covered with pristine forests and wildlife was abundant with nearly 1 lakh tigers roaming the jungles.

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Being a plant is not easy and if you are one living at an altitude of 4,500 metres in a cold, windy, arid pasture, life can be tough, to say the least. With a host of herbivores ready to have a go at you and the weather hostile, both in terms of extreme temperatures (-40 °C in winter) and very low moisture; you are faced with endless dangers. Yet, a leisurely walk in a Trans-Himalayan steppe pasture will unravel a fascinating array of plants, each with even more fascinating adaptations and ecological roles. Adorned with beautiful flowers and often armed with thorns, strong odour and poisons, these natural wonders show how survival in a harsh environment can be made easy and interesting!

A jewel among the high altitude Trans-Himalayan steppe vegetation is Peashrub or *Caragana*. With over 100 species in the world, *Caragana* has a wide distribution ranging from Caucasus to Central Asia, Russian Siberia, Korea and Japan, and in south up to northern India (in the Himalaya) and Bhutan. It is a very hardy plant known to survive in a vast temperature range from -40 °C to 45 °C! Locally called *thama/dhama* in Spiti and parts of Ladakh, a common species – *Caragana versicolor*, growing roughly between 3,900 and 4,600 metres, is the focus of this article. This thick, bushy, cushion-like plant with vibrant yellow flowers often occurs in neat ‘formations’ in its natural habitat. It is one of the commonest plants of the high pastures in Spiti Valley. The rounded bush-like growth of *Caragana* is indeed a smart response to a nutrient and moisture starved, windy habitat of the high altitudes.

Caragana adorns the roof-tops of houses in several villages of the region, neatly stacked after harvesting and drying. Striking and decorative, it is not just to add beauty that the plant is up there. Its real contribution there is in

The ‘Steppe’ Mother

Text: **Pranav Trivedi**



PRANAV TRIVEDI

The tenacious *Caragana* holds its ground in this harsh landscape

preventing the direct impact of water and snow on the predominantly mud houses, and also in maintaining heat. A dead and dry *Caragana* is certainly valuable, but this amazing plant’s real worth is when it is alive and at home in the high altitude steppes, which it enlivens with its small and beautiful papilionaceous (butterfly-like) flowers.

If you have already started visualising *Caragana* as a benign inhabitant of a harsh landscape, you are in for a rude shock! Equipped with sharp thorns, it is notorious for the

prickly touch that it can give to a stranger admiring this plant! But the thorns do much good for the plant and for many other creatures. Apart from protecting *Caragana* from the wild and domestic herbivores, thorns also protect all those creatures who take shelter in there. So, if you look carefully within the clump of a *Caragana* bush, it will appear like a “micro protected area” with several other plants peeping through its top and a host of animals occupying the interiors. Onion – *Allium cepa*, *Stipa* – an important fodder grass,



The Blue Sheep browsing on the *Caragana*

and *Eurotia* – a key food item for herbivores, all find a safe sanctuary within *Caragana*. Of course, when they raise their 'heads' too high, forgetting the favour of their host, they are browsed upon by livestock or Blue Sheep.

Caragana itself is fed upon by sheep and goats, as well as by Blue Sheep. The plant is known to be rich in protein containing up to eight amino acids essential for animal growth, nitrogen and several minerals, including

phosphorous, calcium, potassium, silica, iron, magnesium and aluminium. *Caragana* is not partial and it shelters animals just like it plays a cozy-thorny host for plants. You will find an amazing diversity of smaller creatures – insects such as ants, crickets, grasshoppers, beetles, butterflies, wasps, bees and bumblebees; spiders and even a species of skink – one of the few reptiles to survive at this altitude. In fact, it isn't surprising that this cold-blooded vertebrate finds comfortable temperature within a *Caragana* thicket in the bright hot sun of the region and could also be hibernating under it during winter. The flowers of this plant are highly melliferous (attracting bees) and the visitors not just collect nectar, they also build their hives within its protected environs. Ground-nesting birds such as Horned Lark, rose finches and warblers take advantage of this plant's protection to build their nests



The *Caragana* holding on to the fertile soil

and raise the broods. Pikas and Woolly Hare use the inner environs of its crown for shelter. During winter when little forage is available and snow covers the entire landscape, *Caragana* is among the few plants that get exposed first. Even during the tough winters, this 'steppe mother' has a few shoots to offer to rescue a hungry Blue Sheep!

Apart from its key role in conserving much of the available moisture, providing forage to herbivores and playing host to a rich array of flora and fauna, *Caragana* has some significant, but seldom noticed, contributions to make. Its most important ecological role is in the nitrogen cycle. Being a legume, it cooperates with bacteria in its roots and runs the mini underground factory



The Papilionaceous flower of *Caragana*

to fix nitrogen from air to the soil. Scientists have documented a highly diverse bacterial assemblage consisting of *Rhizobia* and several other genera of nitrogen-fixing symbiotic bacteria. It is also postulated that this rich diversity of *Rhizobia* could have helped this plant species adapt in this arid region. So, in areas where *Caragana* dominates the steppe vegetation with other legumes, it ensures that the soil is kept fertile and suitable for plant growth, thus supporting a large livestock population as well as wild herbivore assemblages. This in turn enables the top carnivores such as Snow Leopard and Wolf, and humans to survive in this feebly productive environment. This 'multi-talented' plant also adds nutrients to the soil through its leaf litter.



The dry and cold home of the 'steppe mother'



PRANAV TRIVEDI

The 'steppe' mother braving the cold winter

Another impressive ecological role is played by the plant's roots; *Caragana's* roots form an intricate and extensive underground network that survives several cold winters, staying alive under a thick layer of snow for almost three to four months. This root network holds the soil tightly, thus preventing valuable topsoil from eroding. The well-formed root system, along with the impenetrably thick crowns of *Caragana* plants, help bind and stabilize the soil, and also act as wind breaks. This

property of the plant has been effectively used in USA, Russia and China. Several species of *Caragana* are known to possess a variety of alkaloids and have high medicinal value in Tibetan and Chinese medicine. Besides, the plant has the potential to provide fibre for paper-making and even a kind of dye. *Caragana* is an excellent source of fuelwood. During the old times, it was one of the commonest and easily available energy options. Many people still use the plant although kerosene and

LPG have virtually replaced it. The whole plant can be used and it burns rather easily even when green.

The cold steppes of Spiti, Ladakh and the greater Tibetan Plateau owe a lot to this 'mother plant' that provides so many ecological services for wildlife and humans. Owing to its crucial role in these high altitude ecosystems, *Caragana* can also be regarded as a 'keystone' species. Isn't it really wonderful that nature has bestowed each ecosystem on Earth with such motherly plants? But, humans have, from time immemorial, taken these 'free' services of nature for granted. To cite an example, this plant has been nearly exterminated by over-harvesting from some parts of Ladakh. Each such loss, even if in a small area, is not only the sign of deterioration of our environment, but also a challenge to our sensitivity and sensibility to explore ways of respecting and conserving our rich and unique natural heritage. ■



Pranav Trivedi is Senior Scientist and Head, Education & Outreach with Nature Conservation Foundation and Director of Conservation with Snow Leopard Trust, India Programme.

SPOT THE DIFFERENCE



For answers turn to page 36



Sow seeds of appreciation for our biodiversity

India is blessed with priceless treasures from dense forests, grasslands, deserts, mountains, corals and coastlines, which harbour a biodiversity that is the envy of the world. The health of natural habitats and their wild denizens is the finest indicator of the long-term health of our nation. All these combined constitute the survival assets for over one billion Indians to ensure a better quality of life.

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SPOT THE DIFFERENCE



Shikra



Common Hawk-Cuckoo

Courtesy: Finn, Frank (1907) ORNITHOLOGICAL AND OTHER COPIES, John Lane, The Bodley Head, London

Text: **Priyanka Iyer and Nikhil Bhopale**

Photographs: **Nikhil Bhopale**

Differences

The Shikra *Accipiter badius* (image on left, page 34) is a commonly seen raptor (bird of prey), belonging to Family Accipitridae, which feeds on small birds, eggs, nestlings, lizards, geckos, rodents, frogs and even bats. The Common Hawk-Cuckoo (image on right, page 34) belongs to Family Cuculidae and is an omnivore that feeds on caterpillars, grasshoppers, ants, as well as fruits.

The traditional Accipiter beak with a curve in the Shikra is one of the major distinguishing characteristics from the Common Hawk-Cuckoo, which has a small straight beak. The adult Shikra's tail does not have tail barring, whereas the Common Hawk-Cuckoo has distinct black barring on the tail. The Common Hawk-Cuckoo has a yellow eye-ring, whereas the Shikra lacks the eye-ring. The Shikra builds a nest of its own, whereas the Common Hawk-Cuckoo is a brood-parasite, that is, it lays its eggs in the nest of other birds such as babblers, laughingthrushes, and thus, takes no part in parental duties.

Why do they look similar?

Since childhood, all of us have heard about the notorious cuckoo not

building its own nest and laying eggs in another bird's nest. Some of us have also wondered how the cuckoo manages this act of cunning without getting caught. In fact, the cuckoo not only lays its egg in another bird's nest, but may also push the host's eggs out of the nest to reduce competition for its nestling. The nestling of a cuckoo, once hatched, is also known to push out the host's eggs or chicks. The Cuckoo may also get more food than the host's chicks as a result of its incessant begging.

Some brood-parasitic cuckoos of genus *Cuculus* are known to resemble raptors. Not only are they long-tailed like raptors, but their plumage is also grey or brown and barred, reminding you, at a glance, of Accipiter hawks. The hawk-like appearance may help the Common Hawk-Cuckoo to scare or cause commotion among the birds it uses as hosts to lay its eggs. This may be because the Shikra is known to feed on small birds and nestlings, in fact the French call this bird the *Coucou shikra*. But the mimicry does not end with appearance alone! Our cuckoo has more under its sleeve, or rather its wing, it is

known to have an Accipiter-like flight. In fact, it is mentioned in Ali and Ripley's *HANDBOOK* in these precise words, "The Shikra-like plumage and flight, together with the birds habit of sweeping upward into the branches before settling, are sufficiently convincing to cause a flutter among small birds each time the mimic is on the move." Cuckoos are known to lure the hosts away from their nest with false pretences and indulge in this hawk-like flight just before egg-laying so that it can sneak in and lay its own egg. Many a times, the way the Common Hawk-cuckoo sits on the perch is similar to that of the Shikra adding a feather to its mimicry of the Accipiter.

Although, we may find this mimicry and the advantage taking cuckoo as unfair towards the little birds that play host to our scheming and smart cuckoo, this parasitic behaviour of cuckoos does not necessarily affect the host species as a whole. In fact, the host species many a times realises the presence of the cuckoo's egg and either abandons the nest or even pushes out the cuckoo's egg. Thus, it is not always that our cuckoo outsmarts its hosts! ■



Nikhil Bhopale is presently working as Assistant Programme Officer in the Programme Department of the BNHS.



Priyanka Iyer is presently working as Publications Assistant in the Publications Department of the BNHS.

Beginning of a journey into Herpetology

Text: Kshamata S. Gaikwad

Even before joining the BNHS, I knew that I wanted to work for the cause of wildlife conservation. Despite very little knowledge and no experience I gathered courage to appear for an interview at the BNHS after completing my M.Sc. in Environmental Science. I was given an opportunity to work as a volunteer in the Herpetology section of the BNHS, and was fortunate to meet Mr. Varad Giri, then Scientist 'B', now Curator, and Mr. Vithoba Hegde, Senior Field Assistant. This was the beginning of my journey as a researcher in the world of Herpetology.



Nature Watch

I wanted to work on reptiles, but knew nothing except the term 'Herpetology' and names of a few snakes. This must have been very disappointing for Varad, who must have expected more from me especially since he became my mentor and guide later on. He must have realized the extent of my ignorance when I asked a childish, but sincere question, "What is a gecko?"; he gently advised me to turn pages and search for information in books. Yes, I had a lot to learn!

I began with activities like preservation, labelling, registration and entering data of specimens in the Collection Department, under the guidance of Vithoba Hegde. I understood with time that this too was equally essential to become a good researcher. After spending almost four months in the laboratory and hunting for information in the library my elementary concepts about herpetofauna were clear. I was then introduced to a new and unknown world, the world of basic taxonomy. And for the first time I was closely looking at characters that govern the identification of reptiles and amphibians. This work was mainly based on the specimens in the collections, and this helped me enhance my knowledge on herpetofauna.

After a few more months of training indoors it was time to test my knowledge in the field, and I was eagerly waiting for this opportunity. I was finally given the chance to join a field trip and was elated. I started gathering field gears for a much awaited experience. With the onset of monsoon, I joined Varad and his team for field work in southern Maharashtra.

We started for Amboli in the first week of June 2008. I was completely amazed with the serene beauty of Amboli, a beautiful hill station located in Sindhudurg district, with semi-



Harish, Ravi and myself having a closer look at a caecilian

evergreen type of forest. Here I met many nature enthusiasts like Mr. Ravindra Bhambure, Mr. Harish Kulkarni and Mr. Raman Kulkarni from Kolhapur, and some local residents of Amboli, Mr. Mahadev Bhise (Kaka), Mr. Rohan Korgaonkar (Baba) and Mr. Hemant Ogale, who were all geared up to accompany us for



Although huge in size, little is known about the feeding behaviour of this centipede

the field trip.

On the first day, we began our search in an old dilapidated palace. Located in the forest with no human settlement nearby and with moss covered walls; the palace appeared to be a potential shelter for some interesting species of 'herps'. We were searching all around when Ravindra alerted a gecko under one of the rocks he had turned. The startled gecko moved under the rock instead of climbing on the walls of the palace. We caught the gecko for close observation of its morphological characters and based on poorly developed lamellae below digits it was identified as a ground dwelling form and the presence of circular pupil confirmed it to be a *Cnemaspis* species.

After this everyone was charged-up and continued searching for more than an hour without any interesting sightings. Suddenly, we heard Harish calling excitedly, he had located a 'caecilian'. The yellow lateral stripe and other characters indicated that it was an *Ichthyophis* species. I was still recovering from the excitement of seeing my first caecilian in the wild when another uncommon event occurred. This time Ravindra and Harish had turned a huge rock under which lay a female scorpion with white hatchlings on her back, a wonderful example of parental care. I had read about this behaviour, but had encountered it for the first time. Nothing that we saw that day was new for the others, but for me it was. This was when I experienced the truly beautiful world under rocks. I was slowly learning the intricacies of field work and was amazed by the spotting ability of my team members. Our search continued and we soon sighted a big centipede feeding on a caterpillar; we photographed and resumed our journey to avoid disturbing it. With this sighting we wound up for the day and went for lunch.

A whole day's search had not tired any member of the team and so we proceeded for a night trail soon after dinner. This time we selected an area within the spread of Amboli village; to guide us on the way we were joined by a local whom we call 'Kaka', who is interested in studying the flora and fauna of his land. The village area had different patches of vegetation all-around. We began our search with a nearby patch. On the way a very petite, yellow coloured toad *Bufo koynayensis* opened the count for our list. After sometime, we reached a spot with an uninhabited house amidst a degraded patch of forest. Here we saw *Hemidactylus prashadi* in abundance, the gecko once considered to be a rare and endangered species! We could see them on the outer walls of the abandoned house. I was curious to learn more about its life history, habit and distribution when Varad's torch-light caught two juveniles, which to my surprise were comparatively brighter. With this heightened anxiety and urge to learn more I returned to my room promising myself to 'ransack' a library on getting back.

The next day added just the usual sightings and nothing much for our list. At night we decided to search at Choukul road, which is on the outskirts of Amboli village. On reaching there I was pleased to see the forest covered with dense vegetation blended with its unique tranquility. On this trail we entered a stream; for that particular moment the fog covered forest was unbelievably silent. Then all of a sudden we heard a cacophony wherein some calls sounded like that of a nocturnal bird. I blindly assumed it to be a bird's call till our torch light caught male frogs' calling in search of their mates. I was more than a little astonished. It was amazing and overwhelming for me to see such natural activity. The frogs were clinging to leaves



HEMANT OGALE

Bufo koynayensis – one of the smallest and beautiful toad, which is endemic to the northern Western Ghats

and calling in succession. On asking which species of frog it was, instead of directly naming the species, Varad explained how to look at different characters in frogs to identify them. Finally, after careful observations and discussions with the team it was identified as a *Nyctibatrachus* species.

On our way back we heard a very interesting call from a temporary rain water puddle close to the road. Ravi spotted a frog, which was identified as *Ramanella* species. I was observing this frog when suddenly my teammates dared to take out their cameras, despite heavy rains, for capturing this action. This was



HEMANT OGALE

Microhyla sp. – one of the smallest Indian frogs with a loud call



HEMANT OGALE

Ramanella sp., are semi-arboreal; the male mostly call from stagnant rainwater puddles

an eye opener for me, wildlife photography appears to be a glamorous hobby, but it is a real challenge. One more thing I learned that night was that open patches with rain water puddles are also potential abode to a wide array of frogs. In one such grassland we heard a vivid

symphony of two to three different species of frogs signaling, a great chance that we did not want to miss. In the beginning, spotting looked easy, but as I started following these calls to locate the frogs, I realized that it was difficult. They were calling from the

border of these puddles and were perfectly camouflaged in the grass, which made spotting them difficult. But we were also equally determined and managed to spot three different species of genera – *Fejervarya*, *Microhyla* and *Sphaerotheca*. It was raining continuously and there was water everywhere. On our way back, we saw an interesting behaviour of a ground dwelling gecko *Geckoella albofasciatus*. This species is mostly seen under rocks or among leaf litter, and is a poor climber. But we saw it on a wall of a culvert at a height of about 1.5 m from the ground; this may be due to the rain water everywhere. That night trail further enhanced my knowledge about taxonomy and behaviour of frogs and lizards.

The next day we planned to visit one of the most fascinating spots in Amboli, Parikshit Point. It was a trek of about three hours through a thick and misty forest, which ended on a plateau. On the way towards it we continued with our search at different patches and this gave us a chance to spot many frogs and toads before



VARAD B. GIRI

A ground dwelling gecko, *Geckoella albofasciatus* sometimes climb certain heights



Lygosoma guentheri, an interesting skink which prefers plateaux

reaching the plateau. We added one more caecilian to our list, which was later identified as *Gegeneophis danieli*. We were so engrossed in our search that it was only when hunger overtook our desire to continue working did we realise that it was six in the evening, and we had only had our breakfast!

Our next destination was Malvan in Sindhudurg district, which is at sea level, with plateaux around 20 m above sea level on its outskirts. As it was another new place for me, I was anxious to reach there. After a quick lunch we set out for another field trip. On the plateau I happened to see one more precious find, a gecko *Hemidactylus albofasciatus*. Most of the species in this genus are arboreal, but interestingly this is one of the few ground dwelling form of *Hemidactylus* geckos. It is only known from a few localities from Ratnagiri district and there is no information about this species except for the original description. Though considered rare, it

turned out to be a common species on the plateau. Our exploration here revealed some more interesting lizards like *Ophisops* sp. and *Lygosoma guentheri*,



VARAD B. GIRI

Wildlife photography – a real challenge

and a snake *Echis carinata*. Another memorable experience of this survey was the spotting of a caecilian, *Gegeneophis seshachari* under rocks on the same plateau.

With this, we concluded our survey. Though short, this survey added considerably to my knowledge. Every moment on the field was a new experience in itself for me. This little understanding was responsible for many questions too. Once back to BNHS, I continued my interest in working on the taxonomy of caecilians and lizards, and worked over the specimens encountered in the field. My passion and persistence has turned into giving me an opportunity to join BNHS as a Research Assistant. This is the real beginning of my career in the field of herpetology. ■

Kshamata S. Gaikwad is at present a Research Assistant in the Collection Department at the Bombay Natural History Society



'Dam virus' engulfs Arunachal Pradesh

Text: Neeraj Vagholikar



BINAY TAMULI

NHPC has ignored an expert committee's recommendation to halt work on the 2000 MW Lower Subansiri project till the downstream impact study is completed

The North-east is slated to be India's 'future power house' with approximately 170 large hydroelectric projects to generate around 70,000 MW planned in the region. The large dams' juggernaut promises to be the biggest 'development' intervention in this ecologically and geologically fragile, seismically active and culturally sensitive landscape in the days to come. We have closely followed environmental governance issues regarding large dams in the North-east for the last eight years and in this piece will share some of the emerging issues in Arunachal Pradesh, the biggest hydropower player in the region.

In May 2008, the then Union Minister of State for Power, Jairam Ramesh, raised concern about the 'MoU virus' (Memoranda of Understanding) which was affecting states like Arunachal Pradesh and Sikkim. He was referring to the very rapid pace at which agreements (MoU) were being signed by these state governments with hydropower companies, particularly in the private sector. The government of Arunachal Pradesh plans to build no

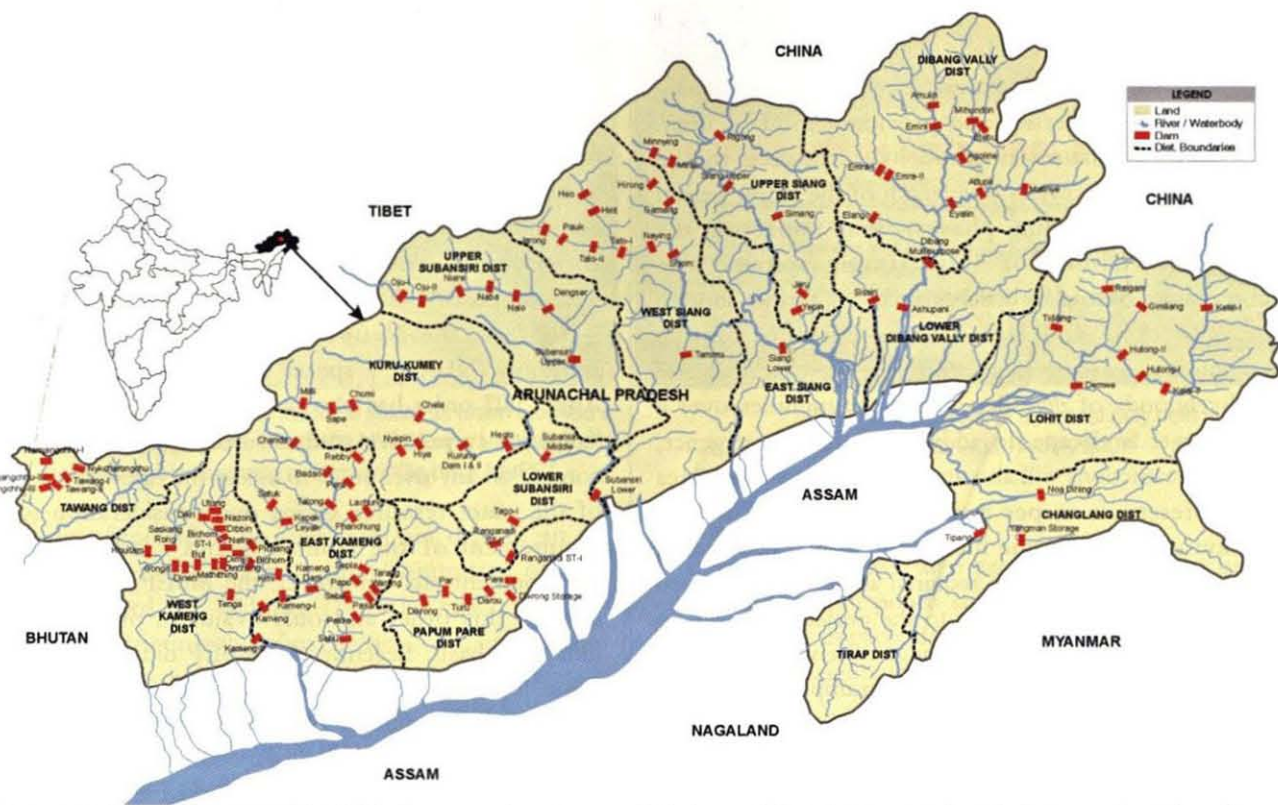
less than 135 dams to generate 57,000 MW of electricity. In the last three years the Arunachal Pradesh government has already signed 103 MoUs for close to 30,000 MW, covering almost all river basins in the state. 30 per cent of these agreements were signed in just five months preceding the Lok Sabha polls-2009, each of them accompanied by huge monetary advances taken from project developers at the time of inking the deal, before any

public consultations were done and green clearances obtained! This kind of process of signing MoUs, where monetary advances are paid upfront, greatly compromises the manner in which subsequent green clearances take place, as projects are considered as a *fait accompli* by both the developer and the state government.

Despite the concern raised by Mr. Ramesh in May 2008, the central government too has played a proactive role by rapid grant of various clearances to these projects ignoring important concerns. For example, in the past two years the Ministry of Environment & Forests (MoEF) has granted pre-construction clearances to all 34 hydroelectric projects in Arunachal Pradesh which were submitted to it as part of the environmental clearance process, even though the state is ecologically sensitive. Jairam Ramesh, who has now taken charge as the Minister of State for Environment & Forests, urgently needs to deal with the serious environmental implications of the 'dam virus', which has engulfed Arunachal Pradesh!

Conservation Notes

Courtesy: Sanctuary Asia (adapted from the original map of the Arunachal Pradesh hydropower department)



The map is based on a map of the AP hydropower department which shows 113 projects, even though the current number of projects has been revised to 135. A small number of the projects shown in the map are commissioned or under construction. The majority of projects are still proposed, although many are at various stages of clearance. 103 agreements have already been signed with power companies

Cumulative impacts

The government and other proponents of large dams in Arunachal say that the blitzkrieg of large dams will serve a dual purpose: production of plentiful power for the nation and economic benefits to the state government through revenue from power export to other parts of the country. However, local indigenous communities and civil society groups have raised serious concerns about the negative impacts. They feel that the manner in which multiple mega dams are being pushed in the state will be disastrous for this ecologically and geologically fragile state.

A major issue which has emerged in recent times is the cumulative impacts of multiple projects coming up in any river basin both in the upstream and downstream areas. These cumulative impacts are not just restricted to the forests and the riverine ecology, but come into play prominently when we look at the unique socio-cultural milieu of the North-east. Many parts of the region are home to very small populations of indigenous communities. Constitutional and legal provisions protect their land rights and also restrict the entry of outsiders into their territories. A major concern raised in the region, particularly in Arunachal, is the likely demographic and

socio-cultural upheaval due to the influx of large labour populations from outside for long periods for the construction of multiple mega hydel projects, which will greatly outnumber the local indigenous people. For example, 17 large hydroelectric projects are planned in the Dibang Valley in Arunachal Pradesh. Dr. Mite Lingi, General-Secretary of the Idu Cultural and Literary Society (ICLS), the apex body of the Idu Mishmi community in the Dibang Valley, says: "The population of the Idu Mishmi community is just about 12,000. 17 large hydel projects will cumulatively bring in around 150,000 labourers from outside. These are long-gestation projects, and we are seriously concerned about demographic changes in the Dibang Valley. The spurt of so many large hydel projects in the Dibang Valley is in direct contradiction of the constitutional and legal protection given to us."

One of the major arguments made in favour of large hydroelectric projects in Arunachal Pradesh is that there is relatively 'small displacement' by submergence as compared to other parts of the country. But a careful perusal of the ground situation indicates that displacement is grossly underestimated, both individually and cumulatively. Shifting agriculture (*jhum*) is a dominant

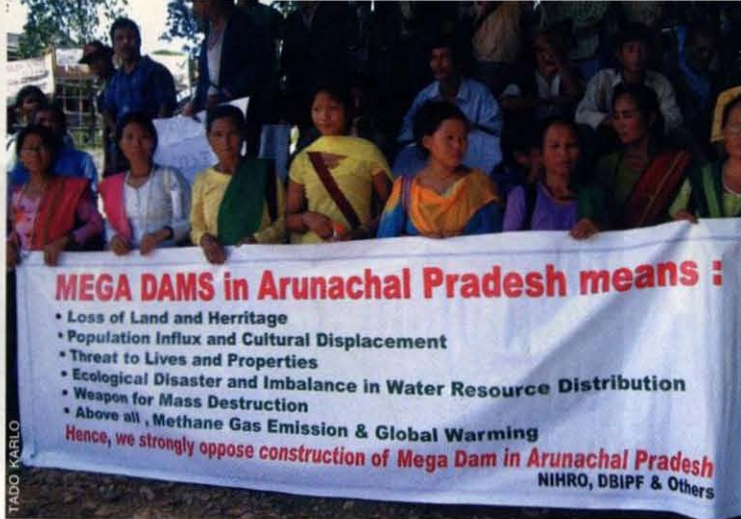
traditional land use in the hills of Arunachal Pradesh and plays a critical role in the livelihoods of people, maintaining agricultural biodiversity and providing food security. Increasing pressures on land have resulted in the shortening of *jhum* cycles (the length of the fallow period between two cropping phases), thus impacting the ecological viability of this farming system. The submergence of land by hydel projects will further shorten the *jhum* cycle and enhance the pressure on the surrounding areas, thus affecting the environment and the livelihoods of *jhum*-dependent communities over a much larger landscape. In addition to the submergence, land use restrictions will also apply in the Catchment Area of the reservoir as per mandatory norms to reduce siltation and increase the life of the reservoir. Further, compensatory mechanisms required as per forest laws to offset the loss of forests due to the project also lead to 'protection' of other areas by change of tenure and access regimes to land and resources. For example, conversion of Unclassified State Forests in AP, currently with greater access and control of local communities, into Protected Forests with greater state control. Thus, impact on local communities is well beyond the submergence area. However, in the existing planning and decision-making

process the social and ecological impacts of these conditions are not assessed and they do not reflect in the decision on the overall viability of the projects, both individually and cumulatively. Dr. Lingi adds: "The small displacement argument to sell these projects needs to be confronted. As per this faulty argument, there will be little social impact even if our entire population of 12,000 were supposedly displaced!"

In fact, the National Environmental Appellate Authority (NEAA), a special environmental court, in an April 2007 order has observed that it feels the need for "advance cumulative study of series of different dams coming on any river so as to assess the optimum capacity of the water resource giving due consideration to the requirement of the Human beings Cattle, Ecology/ Environment etc." However, the MoEF has chosen to subvert this order and only evaluates projects on an individual basis. Recently, the MoEF did prescribe river basin level studies for two river basins in Arunachal Pradesh where multiple dams are coming up – Bichom and Lohit. However, the clearance of individual projects in these river basins has been delinked from the results of the full river basin study! Therefore, the river basin study has been reduced to a cosmetic exercise, since



The Ithun river, a tributary of the Dibang. This is part of the submergence zone of the 3000 MW Dibang Multipurpose project



On March 12, 2008 villages along with the local students union blocked a cosmetic public hearing proposed for the 3000 MW Dibang Multipurpose project. The message was strong and clear: "Go back NHPC"

Women activist at a protest rally held in Itanagar, in July 2007

clearances of individual projects does not depend on it. In December 2008, the Standing Committee of the National Board for Wildlife (NBWL) has relaxed a condition restricting the construction of dams in the upstream areas of the Subansiri river, earlier imposed while granting clearance to the 2000 MW Lower Subansiri hydroelectric project coming up on the Arunachal Pradesh – Assam border in May 2003. This relaxation has happened without consultations with downstream Assam, and ignoring a demand by some members of the Committee to first get an understanding of the cumulative impacts of 22 large hydel projects, which can potentially come up in the Subansiri river basin once the restriction has been lifted.

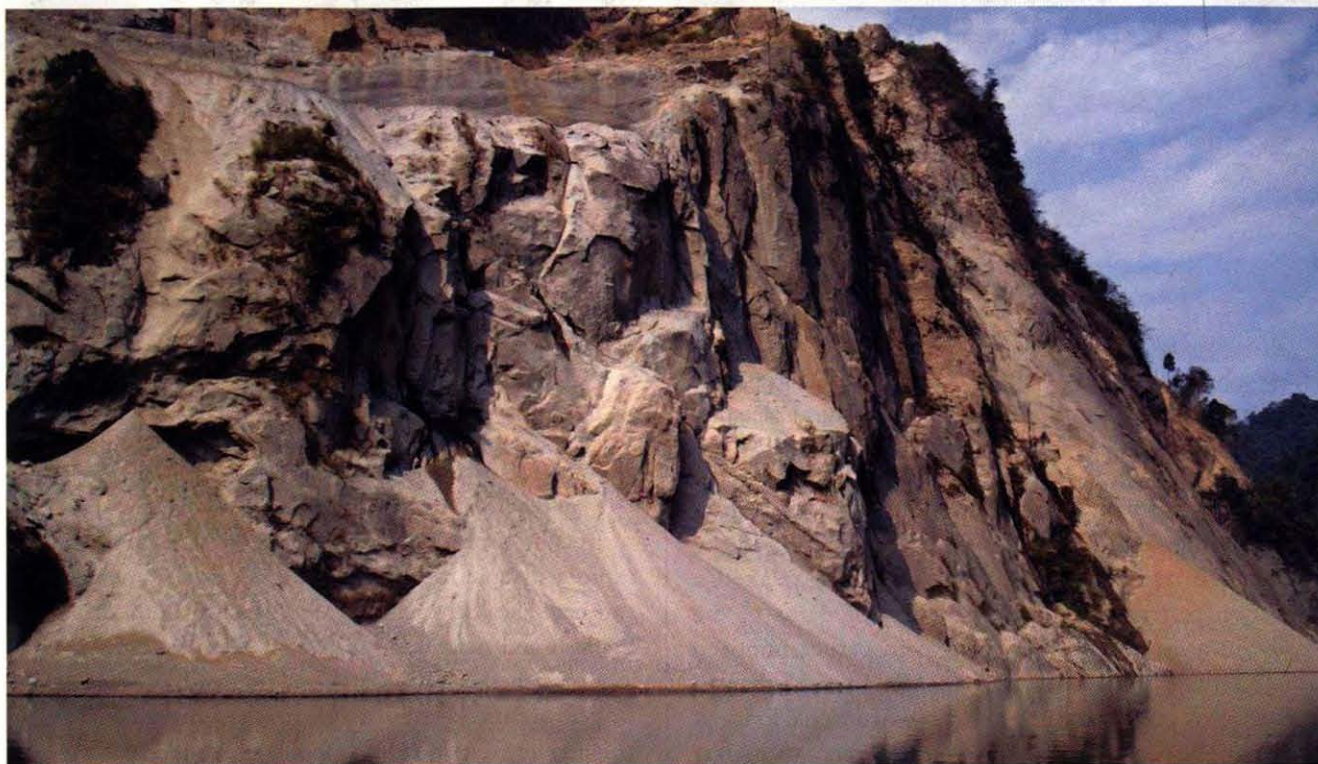
Undermining biodiversity hotspots

Two out of three global biodiversity hotspots in India – Himalaya and Indo-Burma – traverse Arunachal Pradesh. It is an area which is still poorly documented, and in recent years biologists have discovered many new species as well as range extension of existing ones in the state. A key feature of the environmental clearance process is the Environment Impact Assessment (EIA) report, which is a critical document aiding the decision-making. Renowned naturalist from North-east India, Dr. Anwaruddin Choudhury, says, "I have examined EIA reports for at least four large hydroelectric projects in Arunachal Pradesh – Kameng, Lower Subansiri, Middle Siang and Dibang. All of them, without exception, are very poor on wildlife aspects. Not only do they grossly under-report the wildlife found in these areas, but some also give false information, such as fabricated names of species. Shockingly, projects are being granted clearances based on such reports. Is it not ironic that we are deciding the fate of such important wildlife habitats based on substandard documents?"

Downstream concerns

Recent times have also seen grave concern being expressed about the poorly studied downstream livelihood and ecological impacts of large dams in both Arunachal Pradesh and neighbouring Assam. The concerns include loss of fisheries, changes in *beel* (wetland) ecology in the flood plains, agricultural losses, increased flood vulnerability due to massive boulder extraction from river beds and sudden water releases from reservoirs in the monsoons. In the 2000 MW Lower Subansiri hydroelectric project under construction on the Arunachal Pradesh – Assam border, a sustained agitation by locals and the All Assam Students Union (AASU) resulted in an expert committee being commissioned in March 2008, to study the downstream impacts of the project. Even though downstream impact concerns were raised right from the time a public hearing took place in September 2001, the project was granted environmental clearance in July 2003 based on poor studies and work has been going on in full swing. In February 2009, the expert committee set up to study the downstream impact of the Lower Subansiri hydroelectric project submitted its interim report. The expert committee has expressed

Some examples of Important Bird Areas (IBAs) in Arunachal Pradesh and neighbouring Assam, identified by the BNHS as per internationally accepted criteria, which are likely to be directly or indirectly impacted by existing or proposed large dams in Arunachal Pradesh include: Chaglagau – Denning – Walong, Chayang Tajo – Khenewa – Bameng, D'ering Memorial sanctuary, Dibang Reserve Forest and adjacent areas, Dibang sanctuary, Dichu Reserve Forest, Eagle Nest and Sessa sanctuaries, Mechuka – Monigong – Jorgging, Mehao sanctuary, Nacho – Limeking – Taksing – Majha, Namdapha – Kamlang, Pakke sanctuary, Tale valley sanctuary, *Chapories* of Lohit river, Dibru-Saikhowa complex, Kaziranga National Park, Majuli, Nameri National Park and Subansiri.



BHASKAR BORA

Indiscriminate dumping of muck and debris in violation of environmental laws and a Supreme Court order have taken place in the 2000 MW Lower Subansiri project coming up on the Assam – Arunachal Pradesh border

concern about the location and foundation of the dam and has recommended that all construction work be stopped till the full study is over. However, this has made no impact on NHPC or the state governments and work goes on. Yet another study has been reduced to a cosmetic exercise! Scientists from North Lakhimpur, Assam, involved in an independent downstream impacts study of the Lower Subansiri project, have also warned of potential impacts on the Kaziranga National Park. Recently, a downstream impact study of the 405 MW Ranganadi hydel project (in Arunachal, close to the border with Assam), which has been in the news for causing floods in downstream areas due to sudden releases of water, was also commissioned by the power company after downstream agitations. The above experience from Lower Subansiri and Ranganadi clearly reveal that downstream impact assessments need to be done upfront to decide whether a project is viable or not. They cannot be commissioned only after construction starts or project is commissioned. In spite of the 'downstream impact assessment' issue being repeatedly brought to the notice of the Expert Appraisal Committee on River Valley & Hydroelectric projects, a committee which appraises dams that come to the MoEF for environmental clearance, they have simply ignored it. In the last two years 34 hydroelectric projects in Arunachal Pradesh have been

granted Terms of Reference (ToR) for conducting Environmental Impact Assessment (EIA) studies by the MoEF. All these ToRs, without exception, ask for downstream studies to be restricted to only 10 km downstream of the project!

In the last few years, Arunachal Pradesh has seen a large number of protests and agitations against the juggernaut of dams planned in the state. For example, the Idu Mishmi community has been campaigning against the 3000 MW Dibang Multipurpose project which is slated to come up in the Dibang Valley because of its major social and ecological impacts. Civil society groups in Assam have also raised concerns about the downstream impacts of these dams. However, seeing how MoUs are rapidly being signed in Arunachal and clearances being granted in New Delhi, these protests are falling on deaf ears. If the government fails to be responsive to this serious issue, we will see major conflicts due to the proposed dams in the region in the days to come. Action is required fast and soon, before the 'dam virus' in Arunachal completely destroys the ecological and social health of the region. ■

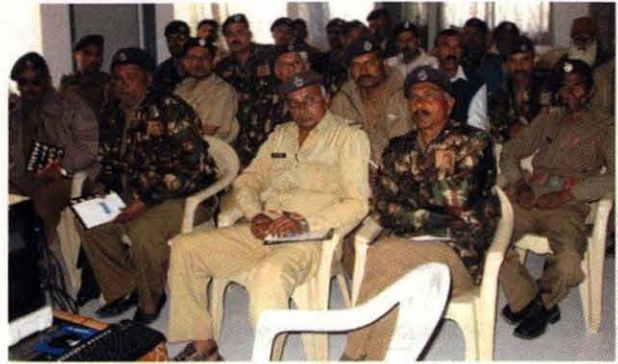


Neeraj Vaghlikar is a member of Kalpavriksh Environmental Action Group. He tracks environmental governance issues on dams in North-east India.

Training Programme on Marine Conservation at Jamnagar

On March 13, 2009, a one day training programme for the frontline staff (guards, foresters and range forest officers) of Marine National Park and Sanctuary (MNP & S), Jamnagar, was organised by the Baroda field office of BNHS. The programme aimed to generate awareness towards Marine Biodiversity Conservation.

The programme was conceptualized and designed by Dishant Parasharya, Research Scientist, BNHS, under the guidance of Deepak Apte, Assistant Director, BNHS. It was inaugurated by Dr. Piyush Mataliya – a senior naturalist from Jamnagar, and Mr. Jyapalsinh Jadeja, Dr. M.S. Varu and P.H. Sata, Deputy Conservator of Forests, who coordinated the programme on behalf of MNP & S were present. Dishant Parasharya spoke on marine biodiversity and



BNHS PHOTO LIBRARY

The guards, foresters and range forest officers at the training programme

its conservation, and monitoring and restoration techniques of coral reefs. Manan Shukla, Project Manager, Project Mangrove, gave a lecture on Mangrove Restoration techniques. The programme was supported by the officials of the Marine National Park and Sanctuary. ■

News from BNHS-CEC, Mumbai

On the occasion of 'Earth Day' on April 22, BNHS-CEC, Mumbai, organised a clean-up drive of the BNHS land and Film City, co-sponsored by Vasundhara Green Club, Malad. Participants took the initiative to speak to Film City officials about managing waste and participated in a rally.

BNHS-CEC, Mumbai, also conducted the fifth batch of the popular Volunteer Training Programme (VTP). Participants were trained in plant and animal identification, environmental education, creativity through games and poster-making and communication skills.

'Wild Brats Junior' and 'Wild Brats Senior' summer camps were held for children (ages 4-8 yrs and 10-14 yrs) between April 17 and 19, and April 27 and 29 respectively. The camps were designed to teach children about conservation through a series of fun-filled activities like nature trails, wild crafts and games, to experience nature first-hand. BNHS-CEC, Mumbai, also held two Family Camps that ensured fun for the whole family on April 18-19 and May 30-31.



BNHS PHOTO LIBRARY

Thirteen bags were collected during the clean-up drive

On May 10, BNHS-CEC, Mumbai, organised, for the first time, a 'Rendezvous with Reptiles', an interactive programme on reptiles with help from Varad Giri, Curator, BNHS, and Kedar Bhide.

On June 28, the much anticipated 'Lunch with Lilies' programme included lily watching, presentation on lilies, life history of Crinum Lily, medicinal lilies, lily gardening, lily quiz and programmes for children. ■

World Environment Day celebrations at Baroda

On the occasion of World Environment Day – June 5 – many programmes were organised by the BNHS Project Mangrove Team at ONGC Ankleshwar, Gujarat. A drawing competition on the theme “General Environment and Mangroves” was held



BNHS PHOTO LIBRARY

The winners of the drawing competition along with the BNHS Project Mangrove team

for the children of ONGC colony. Bhavik Patel, Education Officer, BNHS, explained the importance of environment, particularly mangroves, and its conservation to the participants. Manan Shukla interacted with the senior officials of ONGC Ankleshwar and made a presentation on “Your planet needs you – unite to combat climate change” A poster designed by Bhavik Patel on climate change was presented to ONGC Ankleshwar, which will be displayed at ONGC.

On June 6, a special awareness programme on eco-friendly practices to be followed at home was organised for the Mahila Samiti, ONGC. This was followed by a brief introduction to BNHS activities and a talk on changes in environment due to human interference by Manan Shukla. A movie on marine environment titled “Diminishing Resources” was screened, and an environment related quiz was arranged. ■

Leatherback Turtle rescued by BNHS Point Calimere Centre

On June 23, 2009, a sea turtle tied to a fibre-glass boat anchored in the Manakudi Estuary was photographed by P. Dhakshinamoorthy, Field Assistant, BNHS-Point Calimere Bird Migration Study Centre. The Leatherback Turtle was harnessed with ropes knotted together and tied to a pillar of Manakudi bridge with a sand bag and stone. The matter was reported to the local wildlife officials. During this entire operation, valuable support came from Sundararaj, District Forest Officer, Kanyakumari district, and Dr. V.N. Singh, Chief Conservator of Forests (Wildlife). The assembled crowd and media were addressed about the importance of conserving turtles. Eight people set the turtle free into the sea.

Sea turtles, mostly Olive Ridley, are regularly caught in fishing nets as by-catch and then slaughtered. An international law for use of turtle



BNHS PHOTO LIBRARY

The Leatherback Turtle, relieved of its misery

excluding device when catching fish exists, but is flouted regularly.

Dr. S. Balachandran, Assistant Director, BNHS, and in-charge, Point Calimere Centre, said, “Although all the five species of sea turtles occurring in Indian seas are included in the IUCN Red Data List as Critically Endangered


and under Schedule-I in Wildlife (Protection) Act, 1972, there is little awareness among the fishing community.” Dr. Balachandran added that Leatherbacks are of profound conservation concern globally after populations crashed by more than 90% in the 1980s and 1990s. ■



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