Hightlights of the issue:


Red Spot Duke


Enter the Dragon


Moths & Climate Change


Kingfishers of the world


Nal Sarovar


Butterflies & Birds

DiversityIndia

Parthenos

April-June 2011

Index

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Cover photo: Dalmatian Pelican *Pelecanus crispus*, in Nal Sarovar Guajarat by Girish Vaze

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Red spot Duke *Dophla evelina* Stoll

Hemant Ogale

Wingspan: 81-113 mm

Status : Not Common

Distribution: subspecies *evelina* in Sri Lanka, *laudabilis* in

South India upto South Maharashtra, *derma* in North East India, Sikkim eastwards.

Life Cycle: The egg was found on 29th September 2010 on the leaf of some species of *Diospyros*. The local call it 'Kalin' meaning 'black' alluding to the balck colored bark. The egg was laid singly. The first instar caterpillar hatched out on 5th October after a week the egg was collected. After seven weeks of continuous feeding the caterpillar pupated on 24 November. Two weeks after pupation, the adult female butterfly emerged. It took massive 75 days to complete the metamorphosis.

Male

Female
















Subspecies *derma* of Redspot Duke *Dophla evelina* from Gibbon's sanctuary, Assam, India

Amol P Patwardhan

Department of Zoology, K. J. Somaiya College of Science and Commerce, Vidyavihar, Mumbai 400077

The male of *derma* subspecies of Redspot Duke *Dophla evelina* was sighted and photographed on 14th December 2010 in Gibbon's Sanctuary, Assam, India.

According to de Niceville(1886) Kollar's locality which was Mussoorie was 'incorrect' and it occurs widely from Assam to Borneo, Philippines. Moore (1899) described three species under genus *Dophla* as *D. evelina*, *D. laudabilis* and *D. derma* with their respective distribution as Sri Lanka, South India and Mussoorie to Malay Peninsula. Antram (1924) also treated it as a separate and rare species. Evans (1932) placed it under genus *Euthalia* and all the three were described as three sub-species as *E. evelina evelina* (Sri Lanka), *E. e. laudabilis* (S. India) and *E. e. derma* (Assam). The status for first two sub-species was given as Rare with apparently no status for *derma*. Wynter Blyth (1957) treated *derma* as sub-speccies and put all three under *Euthalia*. Wahlberg (http://www.nymphalidae.net/Classification/Adoliadini.htm) treats this as a sub-species of *D. evelina*.

The male I observed was a tattered one. He was basking on forest road. When disturbed he flew upwards towards the branches and settled on a leaf giving an opportunity to photograph the underside. After sometime he was active and disappeared high in the canopy.

Fig. 1. UP of male *Dophla evelina* subsp. *derma*

Fig. 2. UN of male *Dophla evelina* subsp. *derma*

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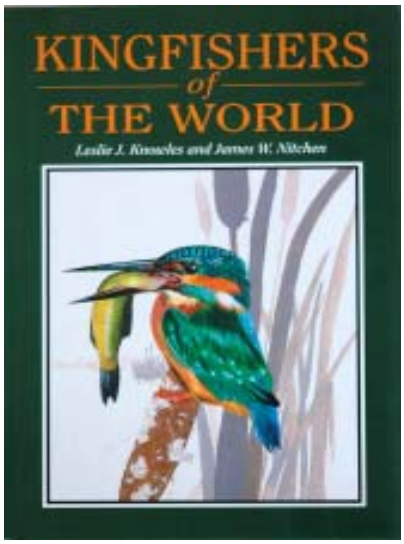
Book Review

Dr. Amol P Patwardhan



Kingfishers of the World

By Leslie J. Knowles and James Nitchen

Published by Times Editions Pvt. Ltd.

Singapore and Kuala Lumpur (1995)

Hard bound copy

200 pp.

ISBN 981 204 470 1

Price not mentioned

About $ 100 on online shops

Kingfisher is one of the most diversified and colorful birds. Fascinating colors and unmistakable long pointed beak are the features that make this bird interesting. Though primarily a fish hunter it is known to feed on insects, lizards. The generic name *Halcyon* has its origin in Greek mythology. Halcyone was a goddess of the winds married to the king of Trachis, Ceyx. One day the king drowned in ship wreck. Seeing this in a dream, Halcyone jumped into the sea close to the spot where Ceyx was drowned. God seeing this, blessed them with life and changed them into kingfishers so that they both can live together near water. The nests were lined by fish bones. God promised that when she and her descendents were hatching their eggs the climate would be calm and waters will be still. This has given rise to terminology 'halcyon days' when days are calm. This story of origin is given in book before the author introduces the topic.

Starting from page 11 to 18, the introductory pages describe the natural history, distribution, citation of old literature. The kingfishers are classified as Order Coraciiformes, Suborder Alcedines, Family Alcedinidae. This family is again divided into three subfamilies viz. Daceloninae, Alcidininae and Cerylinae. The closest relatives of kingfishers are bee- eaters, motmots and todies. Members of all three subfamilies are represented in India. Next is the genera wise list all 86 species of kingfishers of the world.

The book is divided into nine different chapters starting from acknowledgment to the index of scientific names. Chapter 4,5 and 6 deal with the three subfamilies respectively. The most unique thing about this book is that it does not contain any photograph but is composed of nice watercolor paintings of all the species by the second author James Nitchen. Academically, he is from the art background but his passion is in watercolor drawings of wildlife. He has completed many study tours in America, Africa and Asia. All the paintings have been reproduced fantastically. While some of the paintings though look abnormal due to selection of abnormal posture of the bird overall the paintings are very nice and give

a general idea of birds habitat. Each species is described in a particular format like common name, scientific name, author, other common names if any, distribution, description, food, voice and nest. This gives a clear idea of the species' natural history. An accompanying distribution map supplements the description. At the end of the species, there is a detailed list and description of the subspecies, if any. As an example, there are 50 subspecies of Mangrove Kingfisher *Halcyon chloris*. All these subspecies are given methodically with general morphological characters of identification. Many species of famous Kookaburra are also described.

The bibliography chapter includes most of the works published till 1995. The last two chapters are of Indexes. One with common English names and other scientific names which makes 'go to page' easy. The front page having a painting of subspecies *floresiana* endemic to Sulawesi, Bali and Moluccas with a large sized fish in the bill is very eye catching. The overall font, font size, line spacing is optimum and is not crunched anywhere. The book has credibility since first author, Leslie Knowles has spent his life studying birds. He has published numerous articles on birds. He was an honorary representative of RSPB. Hence the book has become one of the finest popular yet fairly scientific publications on kingfishers.

Blue eared

Common

Oriental dwarf

Stork billed

Black capped

Collared

Ruddy

White throated

Pied

Crested

Wild Vet

'MONITOR'ING TO THE SUCCESS

Dr. Kiran Shelar

The Indian Monitor Lizard (*Varanus albigularis*) was run over by vehicle and sustained multiple fracture in front half of the body. This included humerus, radio-ulna of both front limbs and few ribs. The injuries rendered him completely immobile by front limbs and it appeared moribund. The complex nature of its injuries demanded first stabilization and then possible surgical fixation of fractures.

The first thing that warranted was reducing stress thereby restriction of its struggle, assessing body functions including urine output and interest in food with simultaneous pain management. Thane SPCA was on the job of providing shelter, nutrition, basking and feedback regarding physiological status of monitor. After a week of continuous monitoring when swelling over the fractured appendages was considerably reduced and when the monitor appeared clinically stable, an orthopedic surgery was scheduled to stabilize the fractured bone fragments of both fore limbs by intra-medullary pinning.

The anesthesia was complex because of possible respiratory compromise on the event of rib fractures. However a combination of balanced pre-anesthesia and safest possible oxygen based inhalant Isoflurane provided a good enough surgical plain of anesthesia for 4 to 5 hours of surgery. The surgery and anesthesia was uneventful. Front limbs fractured bone fragments were aligned into their normal anatomical position and were stabilized by intra-medullary pinning. The lizard came out of anesthesia within 15 min of surgery. The operated legs were secured by body binding with surgical tape. Post-operative oral antibiotic and pain killers were prescribed for 10 days. To prevent tendon contractions it was decided to untape the secured legs periodically for short duration of time.

Reptiles being cold-blooded have their metabolic rate dependent on environmental temperature. Their healing depends on their metabolic rate, physiological and psychological well being. These parameters are largely driven by captive temperature, basking, nutrition and management. If everything goes at their optimum, the bony injury would take at least 2 months to heal completely. So a very difficult and important job was at hand to make the Lizard happy in the cage!

In captivity, care was taken to enrich the immediate surroundings to simulate their natural habitat. Initially the lizard had to be force fed raw chicken during night hours, however soon after 2 days the lizard started having food on its own. This was certainly a good indication of physiological well being. Another prime goal set for the lizard during captive management, was to avoid habituation or human tolerance. To achieve that, the feeding was done at irregular intervals and timing without exposing any staff to the lizard. Same care was taken at the time of basking. After exhaustive two months of recuperation the lizard was fit for release back to

the natural habitat. The smoothness of the leg movements and subsequent radiograph revealed completely healed bones. It wasn't necessary to remove the pins from legs also. The lizard was set free in dense vegetation near Atavli-Bhuatavli Gaon under the guidance of the forest guards. The moment after release the lizard took hide in a rocky crevice; the last glimpses of the wonderful creature!

Common Indian Monitor *Varanus bengalensis* attended by the vets

As per IUCN (http://www.iucnredlist.org/apps/redlist/details/164579/0) the status of this species is Least Concern (2009). This species is found wide variety of habitat deserts to floodplains. Though least concern this species is facing dwindelling population due to habitat destruction and poaching for meat as well as hide. As per the Indian WPA it is protected as Schedule I species.

Details about is natural history are nicely presented on http://www.varanus.nl/V_bengalensis_beschr_eng.htm

Enter the Dragon

Parag Rangnekar

I have always loved Entomology. If not for my choice of the University, I would have earned a Masters in Entomology instead of Plant Pathology. The interest begun with Honeybees as our Professor, Mr. Kulkarni taught us Apiculture during the undergraduate days. Even as some of my friend found it tough to remember the scientific names, let alone spell them correctly, I found myself at ease with the whole business. The course taught me the applied angle of Entomology but the seed of taxonomy was sown somewhere deep within.

It was sometime in 2008, 9 years after I earned my Masters Degree and after my book on butterflies was being received well that I decided to take insect taxonomy seriously. The Phylum Insecta is so vast that one lifetime would be insufficient to study a single Order. Butterflies or Order Lepidoptera seemed the obvious choice but my selection of the Order Odonata, which consists of Dragonflies and Damselflies probably, has its origin in Amboli, the village where my interest in wildlife can be traced. As a child brought up in a village setting, I was witness to the game of catching dragonflies and tying their tails with thread.

Trumpet Tail *Acisoma panorpoides*

I say witness, since I never found the game amusing, one, since I felt pity for them and second since I knew they bite back. I did catch them though, but the smaller ones and observed how they tried to bite anything that was brought close to their mouthparts. But what caught my imagination where those which flew in thousand over open field and never seemed to tire.

Kerala Dartlet *Agriocnemis keralensis*

There would only be few on one day and on another the whole open field would be swarming with the reddish coloured dragonflies. It was fun to see the Small Green Bee-eater hawk them in the air, beat them against the wires, break off their wings and swallow them. Numbers would be so high on occasions that a few would get crushed under passing vehicles. Now I know they are called the Wandering Gliders (*Pantala flavescens*) and rightly so.

That was a very long time back and after graduating I had the opportunity of being associated with the World Wild Fund of Nature (WWF) as a Volunteer and took pride in sharing my knowledge of biodiversity with adults and children alike during

many of the Nature Trails and Camps. One hurdle though was the identification of Odonates. With no guide readily available, like the ones for Birds and Butterflies, all the different species remained just Dragonflies and Damselflies for me. By the way, somewhere in between I learned that the smaller cousins of the Dragonflies are called Damselflies.

It was my Nikon D80 brought in 2006 that changed things for the good. Armed with a 105 mm Macro lens, I started photographing Dragons and grew to genuinely appreciate their amazing variability. With the collection growing and the need to know their identity made me look for people and sources which would help in identification. The world of the internet was a mine of information and within a short time I had names for most of the photographs. But something somewhere was amiss. I felt like the school kids accompanying me on trails and accepting every word that I said or all identifications that I made without ever questioning their authenticity. That is the time I decided to identify Odonates myself. The seed sown in the college days had finally germinated.

What has followed has been a great learning experience full of joyous, proud and frustrating moments.

Blue-tailed Yellow Skimmer *Palpopleura sexmaculata*

It is ironic though that the basic work done by the British of cataloguing the biodiversity of this Country still remains the most widely used literature for identification of lesser fauna. The three volumes of The Fauna of British India on Odonata by Fraser (1933-36) is a monumental work and one wonders how anybody could dedicate so much time and energy to classify organisms which even in today's world are not considered significant enough.

I also became conscious that the State of Goa has only 39 species documented by various researchers and here I was holding images of around 70 species. The first peer reviewed work for the State of Goa was by Prasad (1995) wherein 22 species of Odonates were reported. The Fauna of Goa: State Fauna Series (2008) by Zoological Survey of India added another 17 species to the list by Prasad, thereby increasing the total species count to 39.

Aciagrion hisopa

There was a conscious understanding of the fact that 39 species for the state is an underestimate and hence detailed surveys were carried out from May 2007 to December 2008. In the field study spanning twenty months, 66 species of Odonates belonging to 12 families were documented from Goa.

The most significant finding has been reports of 34 species and 4 families for the first time from the State of Goa. The four new families viz., Platystictidae, Euphaeidae, Cordulidae, Aeshnidae include species which are mainly found in and around water bodies in areas with good forest cover. The absence of species representing these families in the previous studies suggests overlooking of such areas in the surveys, which is evident from the locations mentioned in the respective papers. The present study has resulted in a staggering increase of 47.30% in the number of species reported from the Goa to 74 from the existing 39.

I wonder how in the world we will ever conserve anything that we do not know exists in the first place. The gaps in our knowledge of our surrounding environment are so vast; it makes me wonder what are we searching for on the Moon and Mars?? I felt sorry that very few students and researchers are interested in Taxonomy, which actually is the brick on which the building of science stands. As I explore the interiors and water bodies of Goa in my search for new Odonates, I realize how important Taxonomy is not only for these winged predators but also for all the wide variety of biota that we have around us.

I will continue on my quest, which I am sure is not going to be any easy one, but hope that more and more youngsters take interest in lesser flora and fauna of this country with a view to aid in their conservation.

Aciagrion occidantale

Emerald Spreadwing *Lestes elatus*

Long-legged Marsh Glider *Trithemis pallidinervis*

Pygmy Dartlet *Agriocnemis pygmea*

Inter dependence of birds and butterflies

Arjan Basu Roy

Studying biodiversity has become more interesting now, with the help of modern techniques and gadgets. Digital photography has helped to capture, wonderful evidences of animal behaviour. A simple photo by an amateur is even helping us to look in a known matter, with unknown perspective. In this case I was about to comment on Hari Iyer's photograph of butterflies sitting on Papaya fruit, ruptured by birds on a tree. Isaac Kehimkar, the eminent lepidopterist, has rightly commented on the photograph as" . . . unlike, as we seen them on plateful of rotting fruits . . ."

But few interesting facts jumbled up in my mind and, instead of writing the comment, I wrote to Hari, for his permission to add that photographs in this article.

Now, coming to the topic, we know in an eco-system interdependence of various life forms are well established. Out of the full chunk as a whole, I am picking up two important components of a healthy eco-system, the birds and the butterflies. I would like to point out how these two are helping each other, in the battle of survival.

1. **Food sharing**: I am starting with this point, just because, the photograph of Hari, mentioned earlier, has promoted the idea of this article. May be many of you are aware of the fact that, many butterflies are more fond of fruit sap, mostly rotten one, over tasty nectars.

Bird helped the buttefly, for having fresh fruit sap by eating a portion of the fruit and keeping it open for them!!

Photograph by Hari Iyer Thane

2. Food source: Butterflies – in their larval form are the most eminent fruit supplier for insectivorous birds. As per my recent study in the butterfly garden of Banabitan at Kolkata, I found statistics which shows the number of birds which is less than 3 (2.89) per day, searching for foods in the initial stage of plantation in the garden. Now it became almost 21 (20.43) in a span of one year, with accumulation of various plants, which are not at all fruit bearers (means those food which are taken as food by the birds) but are all known larval host plants for butterflies. Not only that, from that plantation, we

Psyche *Leptosia nina* feeding on bird dropping

Photo by Arjan Basu Roy

are also picking larva at an average of 21 larvas a day for the last six months to feed our butterfly raring lab. So if we correlate the statistics, one can easily understand the impact of butterflies in supplying food for the birds in an eco-system. Apart from this, butterflies are one of the major pollinators. The effect of that pollination serves the birds and other frugivores first, by producing fruits for them and in the process, helps the plants to proliferate. On the contrary, different butterflies are also seen, feeding on bird droppings. The mineral and salt contain of the bird dropping was taken by the butterflies as a necessity for their survival. Most commonly found butterflies at bird droppings are skippers and the blues.

Chestnut headed bee eater with Common emigrant
Photo by Unni Pulikkal

Plaintive Cuckoo eating caterpillar
Photo by Sumit Sen

3. Mimicry: For this aspect the butterflies are more dependent on Birds! How? The initial instar stage of many lovely papilionidae butterflies resembles the form of bird droppings! To distract a bird, from their yummy food, they are taking the appearance of their frass as defensive mechanism for their most vulnerable stage of life.

Bird dropping stage of Lime *Papilio demoleus* caterpillar
Photo by Arjan Basu Roy

With all this evidences, it can be said that, even a prey and a predator can have a surviving symbiotic relation, in their day to day activities.

Climate change and Moths of Uttarakhand

Peter Smetacek

After coming to the western Himalaya in 1949, my grandfather began collecting butterflies. The hobby was carried on by my father through the years and handed down to us children. Living on a forested hill called Jones Estate, near what was then little more than the village of Bhimtal (in present-day Uttarakhand), collecting insects was one of the few absorbing diversions that presented itself.

Although my father was familiar with the butterflies, literature on moths was rather scarce at the time. The series on the moths of British India by Sir George Hampson were about the only books covering everything. Unfortunately, they were out of print until 1976, when they were re-printed in Delhi. Before this, the series was borrowed from the local college, but given the limited time the books were with us, no one was able to decipher much from them.

As a result, the moth collection, although extensive, was by and large unidentified. Nevertheless, additions were made by the simple expedient of memorizing the moths in the collection and taking whatever appeared to be new, comparing specimens with the collection before setting them on the boards.

It was only during the 1980s that I really managed to come to terms with moths. The larger ones, naturally, drew me first and of these, the hawkmoths were undoubtedly the most attractive. At the time, between 25 and 50 hawkmoths would visit the lights every night during the season, making things rather interesting.

Although Hampson had dealt with this family in his series, two later workers, Francis Scott and T.R. Bell had worked extensively on this family during the early part of the 20th century. Their data, along with taxonomic changes made by Lord Rothschild and Keith Jordan were incorporated in the fifth volume on moths in the Fauna of British India series, devoted solely to the hawkmoths and published in 1937.

They had done most of their work in three locations- Mussoorie in Garhwal, Shillong in Meghalaya and the North Kanara district of Karnataka. Most of the species had been bred and the early stages described in detail.

Using this, it was possible to identify practically all the hawkmoths in our collection. In addition, Dr. Ian Kitching at the British Museum (Natural History) in London was extremely helpful. However, at the time, correspondence was by means of letters, which took a fortnight each way, permitting at best, one matter to be resolved a month! When the job of identification was complete, an unusual fact came to light- almost a third of the species in the collection had been recorded from Sikkim eastwards and were, therefore, unreported from the western Himalaya. The figures were as follows: 108 species of hawkmoths recorded in the literature and in our collection from the Kumaon Himalaya; of these, we

had recorded 77 species. Of the former figure, 53 species were not reported from the western Himalaya by Bell and Scott. Now, Bell & Scott had published their work in 1937, some 50 years before. It was difficult to believe that they had overlooked so many well established, common species in Mussoorie. Therefore, two possibilities presented themselves: the first, a large proportion of the hawkmoths recorded from Jones Estate did not occur in Mussoorie, some 200 kilometers west. The second possibility was that they had moved into the area recently, after Bell & Scott had completed their studies.

Hyles nicaea lathyrus

Only one species, *Hyles nicaea lathyrus*, had a definite eastern limit: it had been recorded "as far east as Nainital" according to Bell & Scott. However, it had never been seen in all our years of collecting some 15 km south of Nainital in Bhimtal, or even during the thirty years we children had lived in Nainital to attend school there.

I decided to follow up the possibility that they had moved into the area recently. This was based on three considerations: the first, and perhaps most important, was that the larval host plants of several species were found in Mussoorie, although the moths were not at the time of Bell and Scott; secondly, Mussoorie was not so far from Jones Estate that stragglers would not venture there, which Bell and Scott would probably have recorded. Thirdly, the question of global warming was gathering momentum at the time: among the early predictions was that the western Himalaya would get warmer and wetter. This would probably be the most plausible reason to account for the fact that the hawkmoth species had, in fact, moved in recently to the western Himalaya since, from Bell & Scott's work, we know for certain that they had not colonized the western Himalaya when the climate was drier and colder, as during the first half of the 20th century.

In 1991, I was invited to present a talk to the University Entomological Society at Oxford. The talk was on Lepidoptera as bio-indicators. This, too, was a fledgling field at the time. Although several butterflies were, by reason of their habits and habitat, admirably suited to use as indicators of the quality of their environment, the hawkmoths presented the largest body of evidence for using insect communities as indicators of climatic change. The thought was intriguing to the audience and there was half an hour of questions after the talk.

As a result, I went around to the Climate Change Unit of the University, to see what material they had on insects. They had recently been established and had data for two insects at the time: one was a bumble bee that had recently started moving northwards from southern England and the second was the Corn borer Moth, which had extended its range northwards on the European mainland.

My host in Oxford was David Spencer Smith, who was at the time Hope Professor of Entomology. As a result, I spent most of my time at the University Museum, where I got an opportunity to work on the second largest collection of Indian insects in the world. In response to my request to look at the hawkmoths, David and George MacGavin, who was in charge of the collection at the time, suggested that I identify as many of the hawkmoths as I could, since no one had worked on them since C. Swinhoe, nearly a century earlier. They were housed in roughly 200 cabinets and a large proportion of the specimens were still unidentified. This was the best news possible, since it gave me the opportunity to read the data labels on each moth to ascertain whether it had been recorded in the area of interest to me! After turning over every specimen in the collection, it turned out there was only one specimen taken in Nainital by Pilcher in 1907 called *Clanis bilineata*, a well known species in the area.

Anambulyx elwesi - New entrant

I had written up the material on hawkmoths of Kumaon and concluded that the new records were, in fact, new entrants for the western Himalaya and their westward movement indicated that the Kumaon Himalaya would get noticeably warmer and wetter in the coming years. (In retrospect, this has been validated, for winters are noticeably milder now. Stone fruit, such as peaches, plums and apricots are dying out in the Bhimtal valley since it seems to be too warm for them. They now thrive at higher elevation. Ceiling fans, which were unknown in the 1980s, are common fixtures in new houses in the area today.) As a result, I concluded, traditional agricultural practices would be negatively affected and disaster faced us. David kindly went through the paper and at the end, he gently asked me why I thought the effect of climate change would be devastating. After all, if an area got warmer and wetter, he went on, wouldn't agricultural productivity increase? Might that not be a good thing, after all? I thought about it and it was undoubtedly true, so the conclusion was modified accordingly. I sent off the paper for publication when I returned to India. It was eventually published in 1994.

Before that, I had the good fortune to visit Shimla in Himachal Pradesh in 1992. We stayed at a small hotel in the suburbs. The next morning, out of habit, I examined the few moths that were gathered around the outside lights that had been left on all night: there was little of interest around the light and on the walls, but, to my delight, I found the forewing of a hawkmoth, *Marumba cristata*, on the floor. It had evidently visited the light at night and fallen prey to a gecko. Luckily, the gecko had bitten

Marumba pectabilis - New entrant

Cypa decolor - New entrant

Marumba cristata

off at least one wing before eating the moth. This moth, which was very common at Bhimtal, had not been reported from Mussoorie by Bell and Scott. The wing was conclusive proof that the moth had moved into the western Himalaya during the last 50 years, since Shimla is west of Mussoorie and if it occurred at Bhimtal and Shimla, it must surely be found in Mussoorie, since Mussoorie lies between the two.

No new species of this family have been recorded in Jones Estate in the nearly 20 years since then. I discovered and bred *Hyles nicaea lathyrus* in Ladakh. It is clear that it is a species of drier areas and the specimens recorded from Nainital were very likely stragglers from the trans-Himalayan area of the Kumaon Himalaya. Their non-appearance at Nainital during the latter half of the 20th century could conceivably be construed as a species retreating westwards in response to a warmer and wetter climate. However, their presence or absence has not so far been confirmed from the trans-Himalayan area of Uttarakhand. In this way, the hawkmoths of Jones Estate became the first insect community to be used to predict, or, in this case, confirm ongoing climatic changes. During the last 20 years, Bhimtal has grown from a group of villages to a fair sized town. Moth populations have tumbled and fewer moths are attracted, even during the peak flying season. Today, Jones Estate is under threat, as building permits are being issued in flagrant disregard of existing rules and laws. The forest is being cleared and hotels, resorts and private buildings are mushrooming. Nothing seems able to stem this tide. On the bright side, Jones Estate has won a place in the annals of Science and some day, we will be able to call it "developed"- like the Indonesian minister during the 1980s, who is reported to have publicly stated, "in another 20 years we will be developed, and then we won't need trees anymore!"

Jones estate

Butterfly research center

Me and Pius at the screen

Indian Wildlife Protection Act

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Chapter II deals with the appointment of authorities. Constitution of the National Board for Wild Life and the Constitution of State Board for Wild Life. The sentences which are struck off refer to the old clauses which are replaced by the new ones.

All the provisions are provided here so that any body who is aggrieved can get information under the RTI quoting the provisions regarding the appointment of members.

THE WILD LIFE (PROTECTION) ACT, 1972

(No. 53 of 1972)

(9th September, 1972)

MINISTRY OF LAW AND JUSTICE

(Legislative Department)

New Delhi, the 20th January, 2003/Pausa 30, 1924 (Saka)

The following Act of Parliament received the assent of the President on the l7th January, 2003, and is hereby published for general information:–

THE WILD LIFE (PROTECTION) AMENDMENT ACT, 2002

No. 16 of 2003

Authorities to be appointed or constituted under this Act.

3. Appointment of Director and other officers.–

(1) The Central Government may, for the purposes of this Act appoint

(a) a Director of Wildlife Preservation;

~~(b) Assistant Directors of Wildlife Preservation; and~~

(i) in sub section *(1)*, clause *(b)* shall be omitted;

(c) such other officers and employees as may be necessary.

2) In the performance of his duties and exercise of his powers by or under this Act, the Director shall be subject to such general or special directions, as the Central Government may, from time to time, give.

~~(3) The Assistant, Directors of Wildlife Preservation and other officers and employees appointed under this section shall be subordinate to the Director.~~

In section 3 of the principal Act, –

(ii) for sub section *(3)*, the following sub section shall be substituted, namely:–-

"*(3)* The officers and other employees appointed under this section shall be required to assist the Director.".

4. Appointment of Chief Wildlife Warden and other officers – (1) The State

Government may, for the purposes of this Act, appoint –

(a) a Chief Wildlife Warden; [***[1]]

(b) Wildlife Wardens;

~~[(bb) One Honorary Wildlife Ward in each district; and[2]]~~

In section 4 of the principal Act, in sub section *(1)*, for clause *(bb)*, the following clause shall be substituted, namely:–

"*(bb)* Honorary Wild Life Wardens;".

(c) such other officers and employees as may be necessary.

(2) In the performance of his duties and exercise of his powers by or under this Act, the Chief Wildlife Warden shall be subject to such general or special directions, as the State Government may, from time to time, give.

(3) [3] [The Wildlife Warden, the Honorary Wildlife Warden] and other officers and

employees appointed under this section shall be subordinate to the Chief Wildlife Warden.

5. Power of delegate – (1) The Director may, with the previous approval of the Central Government, by order in writing delegate all or any of his powers and duties under this Act to any officer subordinate to him subject to such conditions, if any, as may be specified in the order.

(2) The Chief Wildlife Warden may, with the previous approval of the State Government by order in writing, delegate all or any of his powers and duties under this Act, except those under

Cl. (a) of sub-section (1) of Sec.11, to any officer subordinate to him subject to such conditions, if any, be specified in the order.

(3) Subject to any general or special, direction given or condition imposed by the

Director or the Chief Wildlife Warden, any person, authorized by the Director or the Chief Wildlife Warden to exercise any, powers, may exercise those powers in the same manner and to the same effect as if they had been conferred on that person directly by this Act and not by way of delegation.

Insertion of New Sections 5A to 5C

After section 5 of the principal Act, the following sections shall be inserted, namely:

Constitution of the National Board for Wild Life

"5A. *(1)* The Central Government shall, within three months from the date of commencement of the Wild Life (Protection) Amendment Act, 2002, constitute the National Board for Wild Life consisting of the following members, namely:

(a) the Prime Minister as Chairperson;

(b) the Minister in charge of Forests and Wild Life as Vice Chairperson;

(c) three members of Parliament of whom two shall be from the House of the People and one from the Council of States;

(d) Member, Planning Commission in charge

of Forests and Wild Life;

(e) five persons to represent non governmental organizations to be nominated by the Central Government;

(f) ten persons to be nominated by the Central Government from amongst eminent conservationists, ecologists and environmentalists;

(g) the Secretary to the Government of India in charge of the Ministry or Department of the Central Government dealing with Forests and Wild Life;

(h) the Chief of the Army Staff,

(i) the Secretary to the Government of India in charge of the Ministry of

Defence;

(j) the Secretary to the Government of India in charge of the Ministry of information and Broadcasting;

(k) the Secretary to the Government of India in; charge of the Department of Expenditure, Ministry of Finance;

(l) the Secretary to the Government of India, Ministry of Tribal Welfare;

(m) the Director General of Forests in the Ministry or Department of the Central Government dealing with Forests and Wild Life;

(n) the Director General of Tourism, Government of India;

(o) the Director General, Indian Council for Forestry Research and Education, Dehradun;

(p) the Director, Wild Life Institute of India, Dehradun;

(q) the Director, Zoological Survey of India;

(r) the Director, Botanical Survey of India;

(s) the Director, Indian Veterinary Research institute;

(t) the Member Secretary, Central Zoo Authority;

(u) the Director, National Institute of Oceanography;

(v) one representative each from ten States and Union territories by rotation, to be nominated by the Central Government;

(w) the Director of Wild Life preservation who shall be the Member Secretary of the National Board.

(2) The term of office of the members other than those who are members ex officio, the manner of filling vacancies referred to in clauses *(e)*, *(1)* and *(v)* of subsection *(1)*, and the procedure to be followed in the discharge of their functions by the members of the National. Board shall be such, as may be prescribed.

(3) The members (except members *ex officio*) shall be entitled to receive such allowances in respect of expenses incurred in the performance of their duties as may be prescribed.

(4) Notwithstanding anything contained in any other law for the time being in force, the office of the member of the National Board shall not be deemed to be an office of profit.

Standing Committee of the National Board

5B. *(1)* The National Board may, in its discretion, constitute a Standing Committee for the purpose of exercising such powers and performing such duties as may be delegated to the Committee by

the National Board.

(2) The Standing Committee shall consist of the Vice Chairperson, the Member--Secretary, and not more than ten members to be nominated by the Vice Chairperson from amongst the members of the National Board.

(3) The National Board may constitute committees, sub committees or study groups, as may be necessary, from time to time in proper discharge of the functions assigned to it.

Functions of the National Board

5C. *(1)* It shall be the duty of the National Board to promote the conservation and development of wild life and forests by such measures as it thinks fit.:

(2) Without prejudice to the generality of the foregoing provision, the measures referred to therein may provide for-–

(a) framing policies and advising the Central Government and the State Governments on the ways and means of promoting wild life conservation and effectively controlling poaching and illegal trade of wild life and its products;

(b) making recommendations on the setting up of and management of national parks, sanctuaries and other protected areas and on matters relating to restriction of activities in those areas;

(c) carrying out or causing to be carried but impact assessment of various projects and activities on wild life or its habitat;

(d) reviewing from time to time, the progress in the field of wild life conservation in the country and suggesting measures for improvement thereto; and

(e) preparing and publishing a status report at least once in two years on wild life in the country.".

~~6. Constitution of the Wildlife Advisory Board.– (1) The State Government, or, in the case of a Union Territory, the Administrator, shall, as soon as may be after the commencement of this Act, constitute a Wildlife Advisory Board consisting of the following member, namely:~~

~~(a) the Minister in charge of Forest in the State or Union Territory, or, if there is no such Minister, the Chief Secretary to the State Government, or, as the case may be, the Chief Secretary to the Government or the Union Territory, who shall be the Chairman;~~

~~(b) two members of the State Legislature or, in the case of a Union Territory having a Legislature, two members of the legislature of the Union Territory, as the case may be;~~

~~(c) Secretary to the State Government, or the Government of the Union Territory, in charges of Forests;~~

~~[(d) The Forest Officer in charge of the State Forest Department, by whatever designation called, ex-officio; 4]~~

~~(e) an officer to be nominated by the Director;~~

~~(f) Chief Wildlife Warden, ex-officio;~~

~~[(g) Officers of the State Forest Government not exceeding five5];~~

~~(h) such other person, not exceeding ten, who, in the opinion of the State Government, are interested in the protection of Wildlife, including the representatives of tribals not exceeding three.]~~

~~[(1A) The State Government may appoint a Vice-Chairman of the Board from amongst the members~~

~~referred to in clauses (b) and (h) of sub-section (1). 6] (2) The State Government shall appoint [the forest Officer in charge of the Forest Department 7] or Chief Wildlife Warden as the Secretary to the Board. (3) The term of office of the members of the Board referred to in C1.(g) of sub-section (1) and the manner of filling the vacancies among them shall be such as may be prescribed. 8~~

~~(4) The members shall be entitled to receive such allowances in respect of expenses incurred in the performance of their duties as the State Government may prescribed.~~

Substitution of new section for section 6

For section 6 of the principal Act, the following section shall be substituted, namely:

Constitution of State Board for Wild Life

Sec."6. *(1)* The State Government shall, within a period of six months from the date of commencement of the Wild Life (Protection) Amendment Act, 2002 constitute a State Board for Wild Life consisting of the following members, namely:-–

(a) the Chief Minister of the State and in case of the Union territory, either Chief Minister or Administrator, as the case may be – Chairperson;

(b) the Minister in charge of Forests and Wild Life – Vice Chairperson;

(c) three members of the State Legislature or in the case of a Union territory with Legislature, two members of the Legislative Assembly of that Union territory;

(d) three persons to represent non governmental organizations dealing with wild life to be nominated by the State Government;

(e) ten persons to be nominated by the. State Government from amongst eminent conservationists, ecologists and environmentalists including at least two representatives of the Scheduled Tribes;

(f) the Secretary to the State Government or the Government of the Union territory, as the case may be, in charge of Forests and Wild Life;

(g) the Officer in charge of the State Forest Department;

(h) the Secretary to the State Government, Department of Tribal Welfare;

(i) the Managing Director, State Tourism Development Corporation;

(j) an officer of the State Police Department not below the rank of Inspector- General;

(k) a representative of the Armed Forces not below the rank of a Brigadier to be nominated by the Central Government;

(l) the Director, Department of Animal Husbandry of the State;

(m) the Director, Department of Fisheries of the State;

(n) an officer to be nominated by the Director, Wild We Preservation;

(o) a representative of the Wild Life Institute of India, Dehradun;

(p) a representative of the Botanical Survey of India;

(q) a representative of the Zoological Survey of India;

(r) the Chief Wild Life Warden, who shall be the

Member Secretary.

(2) The term of office of the members other than those who are members *ex officio* and the manner of filling vacancies referred to in clauses *(d)* and *(e)* of sub- section *(1)* and procedure to be followed shall be such, as may be prescribed.

(3) The member (except members *ex officio* shall be entitled to receive such allowances in respect of expenses incurred in the performance of their duties as may be prescribed.".

7. Procedure to be followed by the Board. –(1) The Board shall meet at least twice a year at such place as the State Government may direct.

(2) The Board shall regulate its own procedure (including the quorum).

(3) No act or proceeding of the Board shall be invalid merely by reason of the existence of any vacancy therein or any defect in the constitution thereof or any irregularity in the procedure of the Board affecting the merits of the case.

8. Duties of the ~~Wildlife Advisory Board~~. *(i)* for the words 'the Wild Life Advisory Board", the words "State Board for Wild Life" shall be substituted;

– It shall be the duty of the ~~Wildlife Advisory Board~~ "State Board for Wild Life" to advise the State Government,–

(a) ~~In the selection of areas to be declared as Sanctuaries, National Parks, and Closed Areas and the administration thereof~~;

(ii) for clause *(a)*, the following clause shall be substituted, namely:-– "*(a)* in the selection and management of areas to be declared as protected areas;".

[9(b) in formulation of the policy of protection and conservation of Wildlife and specified plants;]

(c) in any matter relating to any schedule;

(cc) in relation to the measures to be taken for harmonizing the needs of the tribals and other dwellers of the forest with the protection and conservation of wildlife; and [10]]

(d) in any matter that may be referred to it by the State Government.

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1 Sec.4(1)(a) "and "omitted by Act 44 of 1991, sec6.

2 Sec.4(1)(bb) "inserted by Act 44 of 1991, sec.6.

3 Sec.4(3) "the Honorary Wildlife Warden" after "The Wildlife Warden" substituted by Act 44 of 1991, Sec. 6

4 Sec.6(1)(d) "Chief Conservator of Forests, ex officio;" substituted by Act of 44 of 1991, sec.7.

5 Sec.6(1)(g) "such other officers and non-officials, not exceeding fifteen, who, in the opinion of the State Government, are interested in the protection of Wildlife, " substituted by Act 44 of 1991, sec.7. and original sub-section renumbered as 'h'.

6 Sec.6(IA) inserted by Act 44 of 199 1, sec.7.

7 Sec.6(2) "The State Government shall appoint the Chief Wildlife or the Chief Conservator of Forest as the Secretary to the Board, "substituted by Act 44 of 199 1, sec.7.

8 Sec.6 (3) "in CL(g)" should have been substituted by C1 (h)" under the amended verdict.

9 Sec. 8(b) "in the formulation of the policy in granting licences and permits under this Act;" substituted by Act 44 of 199 1, sec. 8.

10 Sec. 8(cc) inserted by Act of 199 1, see. 8.

Wildlife Blogs

Aniruddha Dhamorikar

1. Catching Flies: http://muscicapa.blogspot.com/

   A blog about wildlife and research tools used in wildlife research by Shymal.

2. Gowrishankar's Blog: http://pogirigowrishankar.wordpress.com/

   A blog by herpetologist Gowri Shankar, revolving around snake research, conservation and public awareness

3. The Butterfly Diaries: http://thebutterflydiaries.wordpress.com/

   A blog about nature, wildlife, travel, science, postage stamps and other related articles by naturalist Ashwin Baindur

4. India naturally: http://indianaturally.blogspot.com/

   A blog by writer, journalist, conservationist and author of The King and I: Travels in Tigerland, Prerna Bindra, on environmental and wildlife conservation issues.

5. Nature Magnified: http://www.naturemagnified.com/

   A blog about nature photography and the biodiversity of Kerala by photographer Thomas Vattakaven

Nal Sarovar and Thol

Girish Vaze

A visit to Nalsarovar and Thol bird sanctuary, 60-70 kms from Ahmedabad was in the offing with family and friends. We reached by flight at about 10 am in the morning, shopped for groceries and left for Nalsarovar. We reached at 1.30 pm stopping along the way to look at birds. Our first sighting was a Black Shouldered Kite *Elanus caerulens* and it thrilled us, but we soon discovered that these kites were spotted on electrical poles every 300-500 meters. After having decided to reach our destination without stopping we spotted by the road-side, a large flock of Painted Storks *Mycteria meucocephala*, Asian Openbill *Anastomus oscitans*, different ibises, egrets and common cranes. We stopped to observe these for a few minutes and then went directly to the Toran resort at Nal sarovar.

The Toran resort is run by the Gujarat Tourism Development Corporation (GTDC) and is comfortable. The rooms are excellent and the birding is pretty good however not much can be said about the food and service. This resort is about 1-2 kms from the Nal sarovar lake and there is a very nice walkway to the lake, which is bordered on both sides by small ponds and marshes. These ponds and marshes afford excellent opportunities to observe various water birds as well as some grassland birds. By evening, many of these birds can be observed right at the edge of the road.The first bird to greet us at Toran resort was the resident Steppe Eagle *Aquila nipalensis*. I say resident as we saw it almost all the time for both the days we were there. Other birds that we saw there were Grey wagtail *Motacilla cinerea*, Yellow wagtail *M. flava*, pipits, Ashy Browed Sparrow Lark, drongos, bushchats, Indian Roller *Coracias bengalensis*, mynas, Small Green bee-eaters etc. We also saw Montagu's Harrier*Circus pygargus* and Marsh Harriers *C. aeruginosus* numerous times and quite closely too.

Nal sarovar lake is about 120 sq kms. It has 26 large islands and about 300 small islands. The lake was only about 2 feet deep at this time of the year and

Great white pelican *Pelicanus onocrotalus*

dries up completely by May - June. One can even observe nests on the dry lake bed in June or so. Exercise caution in choosing your guide or else they will rip you off. One enterprising fellow was telling us that the flamingos hadn't come this year but we could show us their "bacchas". He pointed them out to us and these "bacchas" turned out to be open-bill storks!!! Perhaps one of the best guides there is a guy called Kasim Mohammad (cell: 9909390147). He is quite knowledgeable and experienced. Another good guide is Aslam. You can call up kurban (9979799742), who owns the boat, and ask for Aslam.

Dalmatian pelican *Pelicanus crispus*

Since the sun was against us, we decided to visit one of the ponds along the edge of the road. There were numerous birds in those ponds like shovelers, gadwalls, pintails, ibises, spoonbills, spotted ducks. However, they were scared quite easily and we didn't approach too close for fear of scaring them away. The land was also very marshy and we had to be careful where we stepped. At around 5.30pm, we turned back and saw lots of birds along the roadside including pied kingfishers, purple sunbirds, green bee-eaters, shrikes. The highlight for me was the sighting of a Bluethroat *Luscinia svevica*, which we saw again the next day at the same place and at

Bluethroat *Luscinia svevica*

the same time. The next day we set out early morning (around 6 am) spent about 15 minutes haggling about the price etc (which you must do otherwise you are liable to get taken for a ride) and got onto a small skiff which is propelled with bamboo poles. Here is when the importance of a good guide really came to the fore. Not only was Aslam quick at spotting various birds among the reeds and on open waters, he was also able to identify them, when we were having difficulties in doing so even through binoculars. Later on, we arrived at one of the islands and waded through ankle deep (and I must add, ice cold water…. Brrrrr) onto the island. Here we saw numerous comb ducks and grey-lag geese. Since we really wanted to see Sarus *Grus antigone* and Demoiselle *Grus virgo*cranes (Demoiselle cranes haven't been seen in Nal sarovar in the last 3-4 years),

Mixed groups of ducks

we walked for a couple of kilometers inland but to no avail. Along the way we saw numerous small ducks and many birds in flight, including a Collared Pratincole *Glareola pratincola*. We spent essentially the whole day on the lake with just a small break for lunch and in the afternoon also saw 2-3 Dalmatian pelicans *Pelecanus crispus*!!! Such lovely birds these are.

By evening, we left for Ahmadabad and arrived at around 10 pm, intending to go to Thol Bird sanctuary, early next morning. Thol bird sanctuary is around 35 km from Ahmadabad. It's basically a small lake with a very convenient walkway around it. Near the entrance, there are a few small ponds which are also teeming with birds. We left for Thol at around 6 am next morning. On arriving, we were greeted with scores of ducks, cranes etc flying in the trademark "V" formation, silhouetted against the gathering dawn. It was a breathtaking site. We also observed a small island in the middle of the water. As the sun rose and afforded better light, this "island" was revealed to be a flock of pelicans (about 70-80 individuals). However, they rose with the rising sun and most of them flew away, leaving about 15-20 individuals in the middle of the lake. The walk around Thol lake was sheer joy. It was nice and cool and pleasantly windy and we could see numerous birds both near and far. Among the new birds we saw here were greater spotted eagle, Great White Pelican *Pelecanus onocrotalus*, Wigeons *Anas penelope*, Bar Headed Geese*Anser indicus* etc. But the icing on the cake was the sighting of Sarus *Grus antigone* cranes!!

White stork *Ciconia ciconia*

Comb duck *Sarkidiornis melanotos*

We saw 4-5 Sarus (quite far away) in the fields bordering the lake. We had all but given up hope of seeing these rare beauties.

All in all it was a thoroughly pleasurable three days doing what we love best, i.e. bird watching. If anyone is visiting this area, make sure you don't miss out on Thol. It's a little known, but superb place for bird watching.

Cave Biosphere and Cavernicoles

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Cave environments are characterized by perpetual darkness, almost constant geophysical factors, high humidity and low energy input which altogether distinguished them from other external environmental biosphere. The organisms colonized cave ecosystem requires high degree of physiological adaptations, behavioral adjustments and often morphological alterations. Infact due to perpetual darkness all the possible autotrophs are always lacking inside the caves and due to which the energy sources in cave biosphere are always limited. The cave organisms (cavernicoles) depend mostly on external sources of energy carriers for their living. Water / air currents, advent/exodus activity of bats / other big animals are some of the major sources which carry food sources for the cavernicoles.

Specifications for Cave life:

Morphological alterations: due to lack of light the eyes of the cavernicoles become functionless and ultimately either remains as rudimentary organ or completely abolished.

Troglobiont albinic and blind cave fish *Schistura papulifera* from Jaintia Hills in Meghalaya

On the other hand in few cavernicoles the extra sensory organs are also found to be developed due to lack of vision . The true cavernicoles are often become pigment-less/albinic due to lack of eyes . Limited sources of energy usually causes stunted the growth of cavernicoles.

A Subtroglophile; *Hydrophylax malabaricus* from entrance to twilight zones in any cave of Western Ghat.

Physiological adaptations: limited sources of energy bound them to operate minimum physiological activities. Less number of egg production, slower growth rate, and bleak movements are some of the common phenomena which represents the same.

Behavioural divergences: limited source of energy, complete lack of light, constant geophysical conditions as well as low predation pressure altogether brings several behavioural divergences in the cavernicoles inside the cave. Such divergence varies from species to species. Variations in food searching as well as mating behaviour are the most common in this regards.

Types of organisms prefer cave life: The organism either accidentally or intentionally entered/trapped inside the cave, somehow succeed to establish their population in it are known as cavernicoles. Till date several theories have been forwarded to explain the cave adaptation of organisms. Among them the pre-adaptation theory forwarded by Cuénot (1925) could be referred as the most accepted one. According to this theory animals become randomly preadapted to all sorts of environments and can survive only in the environment to which they are preadapted.

Classification used to categorize the organisms: Till date several classifications have been forwarded on the basis of bondage between any cavernicoles with their ambient environment. However, as per the current classification forwarded by Sket (2008) the cavernicoles are of four types.

A Eutroglophile (with long antenna and light body colorization); A cricket *Arachnomimus sp.* from the caves of Jaintia Hills, Meghalaya

• **Troglobites:** the species strongly bound to cave habitats, generally fails to survive in external environmental conditions.

• **Eutroglophile:** the species phylogenetically young in cave habitat but maintaining a permanent subterranean population and could be referred as future troglobites.

• **Subtroglophile:** species prefers perpetually or temporarily a subterranean mode of life but is strongly depend in its ambient external environmental habitats for some biological functions on a daily (e.g., feeding) or seasonal (e.g., reproduction) basis.

• **Trogloxene:** species deal sporadically a cave habitat and unable to establish a sustainable subterranean population. This tendency may be for regular feeding or to take temporary/permanent shelter.

A Subtroglophile; *Rhinolophus rouxii* from the caves of Kanger Valley National Park

A Trogloxene; *Calotes versicolor* usualy found to sit near the entrance of the cave and often enters till the twiligh zones

Where to look for cavernicoles in any cave:

In any cave the cave habitat could be traced from the very beginning zone of the cave. The entrance corridors are always found to be captured by Arachnid (eg. Huntsman spider, Opiliones), these are found to be very sensitive to the anthropogenic disturbances. Further, since the little darken zone till the inner most areas the crickets with long

antenna could be easily viewed . The disturbance free inner and higher chambers are usually occupied by the bats where they roost during the day time.

Deposition of bat guano beneath to any bat colony supports several guanophilic cavernicoles, these are generally small arthropods, gastropods etc . If such depositions are not so far from the entrance than several anurans could also be viewed in the same area. If any epikarst water fed small pools are exist in such cave than it must be with a complete aquatic ecosystem in its own way.

Finally, the cavernicoles are the silent sentinels for any subterranean ecosystem which have been created after several years. They are highly endemic and precious, to know them and to conserve the same must be the priorities of every human beings especially biologists.

Acknowledgement: we are highly thankful to Jayant Biswas for providing us the supporting images from his collection.

Further Reading:

Biswas, J. 2010. Kotumsar Cave Biodiversity: a review of cavernicoles and their troglobiotic traits. Biodivers Conserv. 19(1): 275-289.

Cuénot, L. 1925. L'Adaptation, Paris, Doin

Sket, B 2008. Can we agree on an ecological classification of subterranean animals? J Nat Hist 42(21–22): 1549–1563

Panaromic view of Dandak Cave, Kanger Valley National Park

Shallong Cave of Jaintia Hills, Meghalaya

Sitting near the entrance of Krem-Mylin of Jaintia hills, Meghalaya

SAVE CAVES!!!