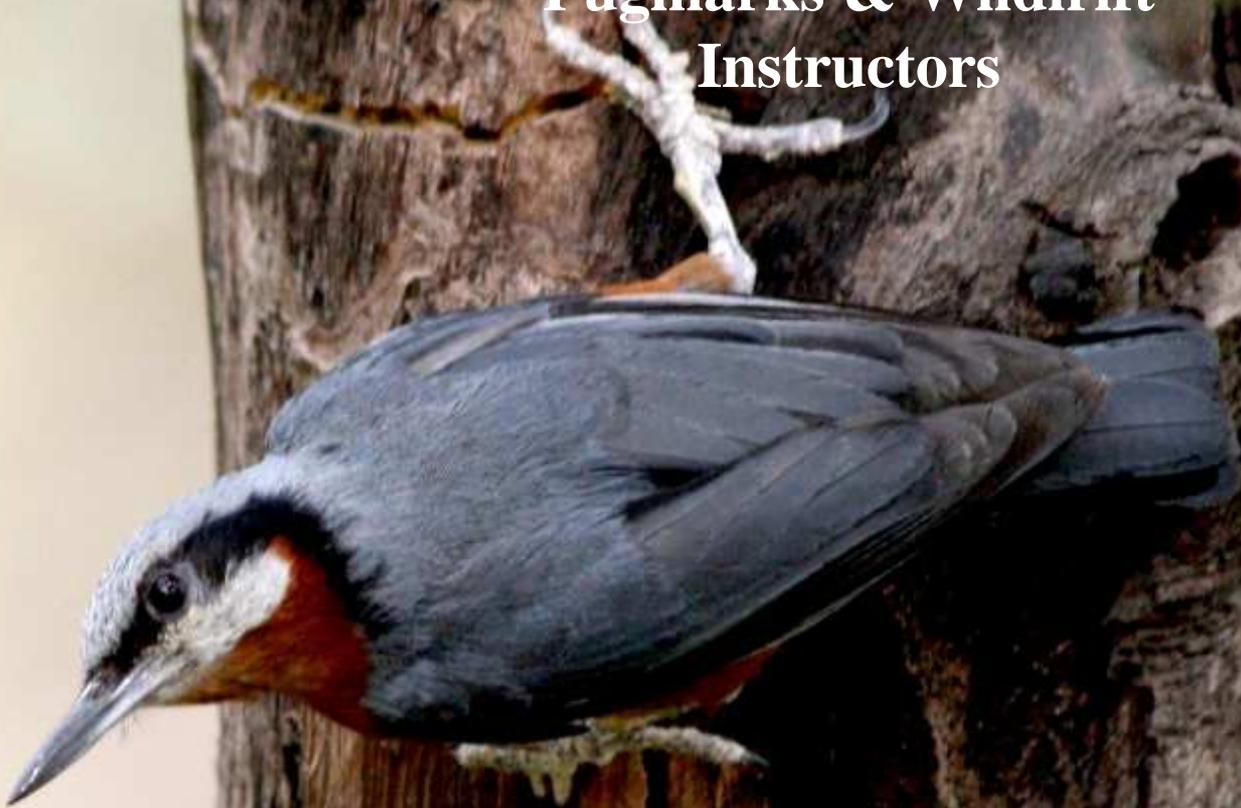


Project Corbett Country

Field Training Programme for
Pugmarks & Wildrift
Instructors



PUGMARKS
&
WILDRIFT Adventures

MAN EATERS OF KUMAON (Shot by Corbett)



NO. IN ORIGINAL	NEW NO. (2007)	YEAR	NUMBER
1- CORBETT MANEATERS	REMANEATERS	1927	474
2- MUSTANG MANEATERS	REMANEATERS	1930	24
3- NAINITAL MANEATERS	-	1930	400
4- BUNGA MANEATERS	-	1930	121
5- THAK MANEATERS	-	1930	121
6- MANDAL MANEATERS	-	1930	121
7- NAINITAL MANEATERS	-	1930	121
8- CHUKA MANEATERS	-	1930	121
9- TALLASS MANEATERS	-	1930	121



Dedicated to the man who has inspired and taught us to read the Jungles - Jim Corbett

Partners in the Project Corbett Country - Kyari

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- 9 Jeevan kumar
- 10 Prakash kumar
- 11 Lalit Kumar
- 12 Chandrashekhar Upadhyay



Project Corbett
Country

Period of study

22nd - 27th June, 2009

Photo credits: Anirudh Chaoji, trishant Simlai and Manas Kulkarni

Cover page:
Cestnut bellied nuthatch.

1. Project Corbett Country - Kyari

Corbett Tiger Reserve field training project

Pugmarks is a Voluntary organisation working in the field of Environment Education and Eco-Restoration.

Pugmarks has been organising Field Training Programmes for its Instructors in various ecosystems of India. In the past, the Instructors had explored the ecosystems of Ranthambore National Park, Rajasthan; Navegaon National Park, Maharashtra; Bhimashankar Wildlife Sanctuary, Maharashtra and Anshi National Park, Karnataka. These training programmes have helped young students to gain field experience, which compliments their formal University Science education. Many of these Instructors are now pursuing Life Science for their Masters programmes.

For this season's Training programme, the sub Himalayan forest of Corbett Tiger Reserve was chosen. Wildrift Adventures, an organisation truly involved in conducting eco-tourism in Village Kyari, was selected as the partner organisation. This report is the outcome of the joint study conducted by the instructors from Pugmarks and Wildrift in the forests around Kyari and Sitabani. The listing is partial and based on the study during the short span of six days. The area is extremely rich in biodiversity and a detailed work on all aspects of the diversity is required.

The prominent work during this study was to study the habitat of the tiger, signs and strategies of the leopard and a detailed study of the bird population during this season. The other aspects of the ecosystem - the flora and the butterflies were also observed.

Man animal conflict was an area of interest for us and the results were an eye-opener. The local community actually co-existed with the wildlife like elephants, leopards and tigers. This was in stark contrast to the situation in the rest of the country and what is painted by the media.

for PUGMARKS

Anirudh Chaoji
Director

An example of Eco-Tourism

What comes to our mind when we hear the phrase "ecotourism" is a safari in a National Park, a guide ticking off jubilantly on a list, an hour long slide-show on why we shouldn't litter and probably another hour of sitting through a cultural programme. Wildrift proved us wrong; Camp Kyari proved to be a true microcosm of the institution termed "ecotourism".

Wildrift started off in 1993 with a small camp, with the objective of providing an "adventure and nature based alternative" to the blossoming resort-based tourism. Over the years, the novel concept took a stronghold and in 1997-98, Camp Kyari was born. A piece of land was leased out from the Panchayat for the camp and in April 2004 bought out by a youth cooperative which now runs Camp Kyari. What sets Wildrift apart in implementing the oft-heard concept of "ecotourism" is their approach of employing only local staff. No distinction is made between proprietary and staff members.



2. “Paradise Forest”- laughing thrushes to yellow throated martens! An Introduction to our study area -Trishant Simlai

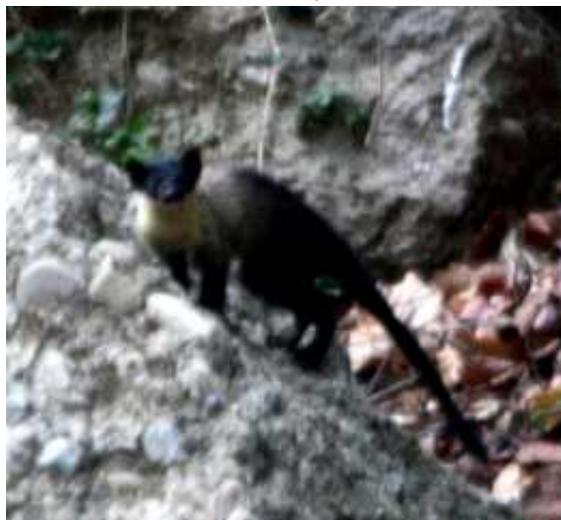
The day I first set foot in this beautiful forest I fell in love with it! We were surveying an area called Bhadragadi around the village of Kyari in the heart of Corbett Country. This beautiful forest is part of the buffer area of the Corbett Tiger Reserve and acts as a major elephant corridor. It is named after a local goddess whose temple lies deep in the valley. The walk started on a dry riverbed with amazing sightings of Oriental pied hornbills gliding through the fruiting trees. The calls of the Indian pitta and the common hawk cuckoo added to the ambience, chestnut bellied and velvet fronted nuthatches fluttered around on tree barks. I walked ahead as I wanted to photograph a paradise flycatcher which was present in the vicinity. As I reached the spot I heard a distant “DHANK” and another “DHANK” followed by a sharp cackle.... these were the alarm calls of sambar deer and Hanuman langurs. Without a second thought I rushed forward towards the direction of the calls. The river bed now turned into a small forest trail full of lantana on both sides, a large herd of ‘chital’ or spotted deer rushed out from the undergrowth to cross over to the other side, a little ahead a barking deer ran into the bush.

The trail now led into a small valley with eroded cliffs on both sides. Here was one of the most amazing habitats I had ever seen, small crystal clear streams, mud banks, rocks, creepers and a typical moist deciduous forest on both sides. This was any wildlifers dream! As I moved ahead a strong odour caught my attention, I investigated and there lay not one but two different droppings! Why would anyone get excited after seeing shit right? Well if there are two different SCAT samples, that too, very fresh ones any naturalist in his senses will jump! These droppings were of tigers, yes, two different tigers! My excitement knew no bounds as I saw fresh pugmarks coming towards me, they were definitely two tigers! I followed the pugmarks and came across a small pool which was all muddy and disturbed, there were paw imprints and the soil around looked as if an animal had sat there! THESE TWO TIGERS HAD JUST LEFT THE POOL!! They had obviously sensed an approaching human party and hurried away into the forest just 5 minutes before us which explained the alarm calls! When the group arrived on the scene I briefed them on the situation and then with Anirudh Sir and Naveen (An excellent field person and local co-ordinator) started studying the pugmarks. It was clear that these were a male and female just around 2 years old, still young they were probably left by their mother recently.

The Pugmarks continued almost everywhere, this seemed like a playground for the two siblings! Our excitement had not died down when suddenly a huge flock of white crested laughing thrushes arrived in the area fluttering around from tree to tree foraging together. These birds were an absolute LIFER for me! This was just the start... soon arrived spangled drongos which are common here, Himalayan bulbuls, black crested bulbuls and ashy bulbuls made appearances too. As afternoon arrived the bird concentration increased, we were so thrilled that we did not know where to look! Every direction had some or the other bird activity! A pair of emerald doves drank from the streams while red breasted parakeets made a racket overhead! white breasted kingfishers fished in the small pools diving and returning to their perches with small fish which they would bang against the ground to kill. Blue whistling thrushes lingered in dark areas close to the water. A crested serpent eagle arrived on the scene which made a sudden racket in the forest as the birds “alarm called” looking at the predator. I was busy clicking oriental white eyes when I suddenly saw something small and red fly in front of me, my eyes looked in disbelief as crimson sunbirds perched within 5 feet from me feeding on small flies in a crevice! I clicked away to glory and managed some really good images of these hard to photograph birds!

After lunch in the paradise valley, we were back to birding. White crested laughing thrushes still continued to enthrall us with their amazing calls. That is when I saw a pair of medium sized birds perched over a stream, a closer look from the binocular made me JUMP again! Here was a pair of blue bearded bee-eaters in front of me! This bird is very elusive and has a very patchy distribution throughout India. We did POP casting of the pugmarks and then sat for a discussion near the small pool where in the morning the tigers were resting. 15 minutes into the talk and suddenly we

The elusive yellow throated marten





hear a distant DHANK! The sambar called thrice and then there was silence for a minute, suddenly a spotted deer called out much closer this time! The rate of all our heartbeats increased. The calling continued and was coming in our direction, this meant only one thing the two tigers had returned and were slowly making their way right INTO US!! We were seated in such a way that an animal would not see us unless and until they took a turn to arrive at the pool. The calling continued... and we were seated motionless waiting for them to appear! Then the calling abruptly stopped and suddenly there was silence! The tigers had sensed us yet again and decided to take a detour as we heard a barking deer call from the other side quite far away! Though there was disappointment the experience of the wait among the calling was excellent! We started our walk back and now witnessed a sudden increase in mammal activity, large herds of sambar and spotted deer crossed the river bed every 5 minutes. On the banks a large monitor lizard was seen, but there was something wrong, it was very slow in its movement and did not scamper away which any other monitor would have, instead it stood its ground raising its body and hissing. Because of the heat it was badly dehydrated and probably injured in a fight with another animal. We decided not to disturb it further and left it to its fate.

We returned to this beautiful valley after two days to make notes on bird abundance and density; as soon as we arrived we were greeted by the sighting of the elusive great slaty woodpecker which is the largest of the woodpeckers in India. The valley seemed quite silent, bird activity was also very less as temperatures were still low. As we started exploring the area we came across

elephant tracks, a lone elephant had come into the area probably the night before. This explained the absence of fresh tiger tracks. Young tigers will immediately move out from the area if there is continuous disturbance or danger. I was observing a pair of ashy bulbuls when suddenly the sound of some movement in the undergrowth caught my eye, when I investigated I found what looked like a brownish rock moving! That brownish rock was an Eastern or elongated Indian tortoise!! My excitement knew no bounds as this was the very first time i was looking at this beauty. This valley of Bhadragadi always throws surprises! The bird activity still seemed very less and it was evident that it would increase only in the hot part of the day, I waited with Naveen as the group started their walk back. As the sun rose overhead and the temperatures increased, birds started flocking to the streams for a drink and a bath. Today was a "woodpecker" day, we had already seen the great slaty in the morning and now black rumped flamebacks were all over the place. The grey headed woodpecker also made an appearance but the show stealer was the lesser yellownape, a first timer for me!! We also came across a family of velvet fronted nuthatches, the two adults foraged for food with the young close behind being fed at frequent intervals.

I had decided on an early morning visit to Bhadragadi on our last day to check on the movement of the two tigers and also for a reason that I couldn't get over the beauty of that wonderful ecosystem! Only 3 of us were to go so that we could keep noise to a minimum. We started at 4 am sharp by a motorbike and reached the trail at 04:15 am. Tiger pugmarks were present everywhere, but they seemed very old. We reached the spot where a small trail with lantana on both sides started. A large herd of spotted deer was about to cross into the lantana, but took a detour after spotting us. Here we found fresh pugmarks coming towards us and a very strong smell of the big cats, it was almost as if they were right next to us. Suddenly we heard an 'Aaaaooonhhh', a typical tiger call very close to us! My heartbeat increased tenfolds! The calling did not stop there, it transformed into growling. These tigers were somewhere in the lantana and were obviously not happy about our presence there! Suddenly I realised that we might have just ruined a chance for the tigers to make a kill as the spotted deer herd which we saw earlier were heading right in their direction and the position which the tigers were in was perfect for ambush. We slowly moved back as we were already warned and instead followed the pugmarks backwards, the two had walked for a long distance territory marking and leaving their scent in prominent places, as we reached the place where the streams started we found a heavily disturbed soil surface, the tigers had played around here, rolled in water and heavily spray marked. We even found a clump of tiger hair where it had rolled and sat. All this, at a place where we had BREAKFAST on the first day! We had missed these two tigers yet again this time by a very narrow margin but had felt their presence like never before. We continued further into the valley and suddenly naveen sir grabbed my hand and pointed towards a rock around 30 metres away. I stared in disbelief as a yellow throated marten lay motionless on the rock!! It then bobbed its head up and down raised its body turned around and drank water from the crevice in the rock, in a flash he returned and repeated the same behaviour and again went back to drink water. He did this multiple times and even posed for me as i clicked away to glory! The marten patiently tolerated our presence for over 5 minutes and then hurried away into the forest. I managed a few record shots as the light was very poor but i was hyper excited about the fact that i had finally seen a Yellow throated marten that too on foot and observed some really interesting behaviour. On our way back, just where we had heard the tigers, i noticed a pugmark on top of our footprints, it was a leopard who had walked behind us!!!

Thus ended our visit, what was that place?? I asked myself- A "biodiversity hotspot" in itself, never before had I seen so much diversity in such a small area! I will definitely return soon to study the beautiful Bhadragadi valley again and again and again!

3. Status and Distribution of Birds in Corbett Tiger Reserve around Kyari - Trishant Simlai

Introduction:

The forests of the Corbett Tiger Reserve are rich habitats for a great diversity of birds. Located in the Himalayan foothills of South Patlidun it has ranges from 400 m to 1210 m. Different types of vegetation are found all along the varied topography, which comprises hilly and riverine areas, temporary marshy depressions, plateaux and ravines. Up to 110 species of trees, 51 species of shrubs and over 33 species of bamboo and grass are found here. Almost pure stands of Sal *Shorea robusta* occur in the lower hilly ridges and flat valleys.

Corbett Tiger Reserve comes under the **Important Bird Area network (IBA)**; it is listed in the A1 Criteria (Globally Threatened Species). **A1 Criteria:** This category refers to species classified as globally threatened with extinction, Conservation Dependant or Data Deficient according to IUCN criteria.

Over 580 species of birds are reported, out of the total 69 species of diurnal raptors, 51 are found in Corbett and of the 26 woodpeckers 15 are reported. This indicates a healthy ecosystem. Although Corbett does not have many restricted range species, it has species of Biome-8 (Sino Himalayan Subtropical Forest), Species from Biome-5 (Eurasian High Montane-Alpine and Tibetan), and species from Biome-7 (Sino Himalayan Temperate Forest). Among the interesting species is Ibisbill *Ibidorhyncha struthersii*, a bird of cold streams and shingle beds of the Himalayas. Brown Dippers *Cinclus pallasii* is also frequent in winter, we recorded the Brown Dipper in the month of July which is an interesting observation.

We conducted a rapid survey of the bird communities along the buffer area of the Corbett Tiger Reserve near the village of Kyari from 22nd June to 27th June 2009. Forest divisions which were surveyed:

1. Belpadav Range, 2. Dechori Range, 3. Ramnagar Range,
4. Sitabani-Kota Range

The following areas along these ranges were surveyed.

1. Bhadragadi Valley, 2. Vandevi Temple road, 3. Aam ki roli,
4. Khichdi-Sitabani, 5. Sitabani

The Habitats surveyed were namely Tropical Moist Deciduous forest, Dry Deciduous forest, Riparian, Scrub, Plantations and Agricultural Fields.

Methodology:

McKinnon's species richness method was used for all the surveys. This method is used when rapid surveys under time constraints need to be done. It is simple, quick and does not require any special observer skills or equipment; it is very useful in multi-species surveys and can be used in difficult terrain and different habitats. It was developed by McKinnon and Philip (1993) in Indonesia. Walks in survey areas are done till enough data is achieved; Lists are made with 10, 15, 20, 25, or 30 birds. But it should be constant for all sites. Once a given number of species eg- 10 have been seen before the survey area has been walked, another list is made which will include birds seen before, if encountered again. 10-15 different lists are made from different parts of the survey areas. Number of times a species reappears in subsequent lists it can be converted into frequency of occurrence which gives some idea about relative abundance of that species when compared with other species. This way, common species are recorded in several lists while rare species are recorded in few. Start time and End time of the lists are recorded. Also Habitat Condition and Weather is recorded.

Bird Communities: Communities have been divided according to the feeding guilds of the birds. A feeding guild is defined by the mode of feeding and the food eaten by the birds.

- 1. Obligate Frugivorous:** Green pigeons and parakeets which feed entirely on fruits, berries, pollen, buds and seeds come under this guild. 2 species of green pigeons were recorded namely the yellow footed green pigeon and the pin tailed green pigeon. The yellow footed green pigeons are distributed uniformly in the survey areas but were uncommon. Flocks of 10-15 birds were seen on the Vandevi temple road. The pin-tailed green pigeon was encountered on the way to Sitabani in a moist deciduous forest patch along the Khichdi river Bed. 4 species of parakeets were observed namely the alexandrine parakeet, plum headed parakeet, rose ringed parakeet and the red-breasted parakeet. The red breasted parakeet was the most common; flocks of around 50 birds foraging together were not a very uncommon sight.
- 2. Fruit-eating Insectivores:** Hornbills, barbet, doves and bulbuls are included in this guild. These species feed mainly on fruits and berries but their diet is also supplemented by insects, invertebrates, and at times small reptiles and mammals. The Indian grey hornbill

Blue Bearded bee-eaters



Black crested bulbul



and the Oriental pied hornbill were seen in good numbers in the Aam Ki Roli area, as this place had many fruiting trees. Many Immature Oriental pied hornbills were encountered. The Great pied hornbill was also recorded from this area, though only 1 individual was seen. The Great pied hornbill is seen in good numbers in the Sitabani area, but we did not encounter any from there. Hornbills are known to travel long distances in search of food, as soon as a large numbers of trees are fruiting, many hornbills are seen in the area. 4 species of barbets were recorded namely the lineated barbet, coppersmith barbet, great barbet and brown headed barbet, the lineated barbet was seen many a times bathing in small puddles during hot afternoon's. It also the most common among the barbets. 4 species of doves were recorded namely the laughing dove, spotted dove, Oriental turtle dove and emerald dove. Laughing doves were seen in open areas and near human habitation while the rest were seen in forested areas. The Oriental turtle dove and emerald dove were elusive and shy and were seen in undisturbed dense moist deciduous forest only. The West Himalayan race of the Oriental turtle dove ***Streptopelia orientalis meena*** is seen in these forests. It has white rather than grey undertail coverts and paler underparts. The emerald dove was encountered near forest streams during hot afternoons. They were seen singly and in just one occasion in a pair. They were very elusive and on many occasions were seen flying rapidly through the forest. 6 species of bulbuls were recorded, namely the red whiskered bulbul, red vented bulbul, black crested bulbul the *flaviventris* race, black bulbul, ashy bulbul and Himalayan bulbul. Red vented bulbuls were seen in secondary forest and near human habitation, while red whiskered bulbuls were encountered in both secondary forest and deciduous forest. The Himalayan bulbuls were seen in monospecific groups or on mixed groups with black bulbuls. The ashy bulbuls were seen occasionally and were recorded only from the Bhadragadi valley. The black crested bulbuls are present in good numbers and were often seen in mixed specie bird flocks comprising of laughing thrushes and babblers.

3. Nectar Insectivores: Sunbirds and flowerpeckers are included in this guild. These species feed mainly on nectar and insects. 3 species of sunbirds were recorded namely the purple sunbird, Mrs. Gould's sunbird and crimson sunbird. The purple sunbird was encountered mostly in open secondary forest. The crimson sunbird was seen regularly in the Bhadragadi valley and Sitabani. They would let us approach very close to them, while they fed on small insects inside moss laden rock crevices. The Mrs. Gould's sunbird is rare and was encountered only on one occasion. Locals claim that it is more common during the winter season. 2 species of flowerpeckers were regularly seen namely the pale billed flowerpecker and thick billed flowerpecker. The pale billed flowerpecker was encountered occasionally, while the thick billed flowerpecker was seen more, often in mixed-species flocks with nuthatches.

Crimson Sunbird



- 4. Ground Insectivores:** This guild is represented by partridges, junglefowl, spurfowl, some babblers, wagtails, pittas and Thrushes. These birds feed on insects by shuffling through leaf litter. Red Junglefowl was present in good numbers; the khali pheasant was seen occasionally and was confined more to the 'Aam ki Roli' area. Jungle babblers were common and grey babblers were seen more near human habitation. The tawny bellied Babbler was encountered once in Sitabani. Among the thrushes the blue whistling thrush was common along the khichdi river bed. The citrina race of the Orange headed thrush was seen on just one occasion near Sitabani. Eurasian blackbird was seen occasionally and only in the Sitabani area. The Indian pitta was seen in Bhadragadi on two occasions. Among the wagtails the white browed wagtail was the most common and seen along the river beds, the grey wagtail was also present and was seen more in Sitabani.
- 5. Sallying Insectivores:** This guild is represented by birds which make sallies from their perches to catch insects in mid air. It includes flycatchers, drongos, martins, swallows, bee-eaters and shrikes. 5 species of flycatchers were seen, The Tickell's blue flycatcher was distributed uniformly though was uncommon. Small niltava were seen occasionally in the Sitabani area. The hill blue flycatcher and the pale blue flycatcher were seen on just two occasions. The verditer flycatcher was seen in mixed specie bird flocks with bulbuls and babblers. 5 species of drongos were seen. Among them the spangled drongo was most common and most often seen in the Bhadragadi valley. They were seen in mixed species bird flocks with white crested laughing thrushes and greater racket tailed drongos. 4 species of bee-eaters were observed, the green bee eater was seen mainly near villages and agricultural fields. The blue tailed bee-eater was encountered in Sitabani and also in Bhadragadi. The blue bearded bee-eater is a rare bird which was encountered specifically in two locations namely Bhadragadi and Vandevi Temple road. This bird has a very patchy distribution throughout its range. More research is needed on this shy and elusive bird.
- 6. Canopy and Bark Insectivores:** Birds feeding on insects in the canopy or on tree barks are included in this guild. Woodpeckers, nuthatches, leaf birds, ioras and minivets comprise of this guild. 10 species of woodpeckers were observed. Woodpecker density was the most in these areas compared to other families of birds. The Vandevi temple road and Bhadragadi showed more abundance of woodpeckers compared to other areas. The Vandevi temple road has a huge teak plantation which attracts many species of woodpeckers. The Black rumped flameback was the most common, the great slaty woodpecker which is the largest woodpecker in India was seen on just one occasion along the Bhadragadi road. Grey headed woodpecker and scaly bellied woodpeckers were seen occasionally. Out of the 10 species, 9 were seen frequently at Bhadragadi suggesting

good insect prey base in tree barks. 2 species of nuthatches were observed. The velvet fronted and the chestnut bellied nuthatch were both seen with juveniles, often feeding behaviour was observed. 3 species of minivets were seen. The rosy minivet was seen on just one occasion in Sitabani. Common ioras were common throughout the study area.

7. General Insectivores: This guild represents birds which feed on insects and small reptiles from any substrate including forest floor, leaves, rocky borroughs and canopy. Most birds comprise of this guild. Some thrushes like the laughing thrushes, shamas, doves, tree-pies, mynas, warblers, rollers and dollar birds, coucals, cuckoos and cuckooshrikes. 2 species of laughing thrushes were observed. The white crested laughing thrush is seen commonly in the Bhadragadi valley but is uncommon in other areas. The white throated laughing thrush was seen only in Sitabani area. White crested laughing thrushes were seen in large flocks of more than 10 birds often in mixed flocks with spangled drongos, rufous tree-pies and bulbuls. 2 species of tree-pies were seen. The rufous tree-pie is common in the moist deciduous forests, the grey tree pie was seen occasionally in the Sitabani areas. These birds are seen mostly in mixed species flocks with spangled drongos and laughing thrushes. The dollarbird was seen on just one occasion on the Vandevi temple road. 5 species of cuckoos and 2 species of cuckooshrikes were observed. The large and the black headed cuckooshrikes were both occasionally seen, both were observed in scrub habitat.

8. Carnivore Guild: Raptors which are birds of prey come under this guild. 9 species of raptors were observed. The long billed vulture and the red headed vulture are both very rare and were observed occasionally soaring above the Bhadragadi valley and Sitabani. Roosting sites should be located and further research must be undertaken for conservation of these endangered species. The black shouldered kite was seen hovering above village fields, the black kite was also seen near villages. Oriental honey buzzards were encountered frequently in multiple habitats. Most were seen in moist deciduous forest but on one occasion we found one perched on the ground next to an agricultural field. This was the most common bird among the raptors. Shikras and besra sparrow hawks were seen in the Bhadragadi valley taking cover in dense canopy. Crested serpent eagle is also seen frequently in Sitabani and Bhadragadi.

Note on the Mountain Hawk Eagle: A mountain hawk eagle was recorded from this area in the month of april, 2 months before this survey was done. We tried to locate this bird again but were unsuccessful. It was seen on a large teak tree near the Khichdi river bed. This bird is mostly a hill species, with two separate populations in the sub-continent. The northern race which we encountered is *Spizaetus nipalensis nipanlensis*, it is distributed throughout the Himalayan foothills from Kashmir to the northeast hill states. The breeding biology of this bird was studied by Rishad Naoroji in Sitabani very close to where we found this bird in 1991. This bird is rare and due to drastic changes in forested habitats in recent times, it becomes imperative to determine the present status in the foothills. Hence more work needs to be done in this area on this specie.

3 species of owls were seen during our survey. The brown fish owl was the commonest of all, it is found in good numbers and we encountered it frequently in Bhadragadi and Sitabani on perches overlooking forest streams. On two occasions we encountered these owls on the forest floor close to streams resting on the ground. The spotted owlet was seen near human habitation while the jungle owlet was recorded once from Sitabani.

9. Water Birds: Kingfishers, storks, egrets, herons, cormorants, dippers and ibises come under this guild. 4 species of Kingfishers were recorded all were found in the Bhadragadi valley and Sitabani areas. The crested kingfisher and the stork billed kingfisher is seen near deeper streams. The white throated kingfisher was seen picking up small fish from small streams and banging them against a rock to kill them before eating them. A little heron was seen in the forest streams on the Khichdi river bed. This bird is very shy and elusive. A woolly necked stork was encountered on one occasion on the river bed. The red wattled lapwing was seen commonly near village field and on river banks. A river lapwing pair was encountered just on one occasion on the Khichdi river bed. A brown dipper was seen in Sitabani, this is a very interesting sighting as these birds are found on higher altitudes. More work needs to be done in recent seasonal migrations of birds, especially due to climate change.

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4. Checklist and Status Descriptions in Corbett Tiger Reserve around Kyari

143 species of Birds were recorded in 6 days of survey. Of these only 4 migrants species were seen. This survey was done in the month of June-July, when many birds are nesting. The Abundance data is for these months only, it is variable in the summer and winter season. For more accurate and detailed listing, survey should be done in all the seasons.

Status Rating:

R: Resident, M: Migrant (Includes Local Migrants)

Abundance Rating:

C: Common- 24 species U- Uncommon- 60 species O- Occasional-38 species R- Rare-9 species

DD- Data Deficient (Birds not occurring in survey lines but encountered en-route and on chance or in different areas)-12 sp.

Sr.N	Common Name	Scientific Name	Resident Migrant	Abundance	
Family- Phasianida					
1.	Indian Peafowl	<i>Pavo cristatus</i>	R	C	
2.	Red Junglefowl	<i>Gallus gallus</i>	R	C	Chestnut bellied nuthatch
3.	Kalij Pheasant	<i>Lophura leucomelanos</i> <i>leucomelanos</i>	R	O	
Family: Picidae					
4.	Rufous Woodpecker	<i>Celeus brachyurus</i>	R	O	
5.	Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i>	R	R	
6.	Brown Capped Pygmy Woodpecker	<i>Dendrocopus nanus</i>	R	U	
7.	Grey Capped Pygmy Woodpecker	<i>Dendrocopus canicapillus</i>	R	U	
8.	Common Flameback	<i>Dinopium javanese</i>	R	O	
9.	Black Rumped Flameback	<i>Dinopium benghalense</i>	R	C	
10.	Himalayan Flameback	<i>Dinopium shorii</i>	R	U	
11.	Lesser Yellownape	<i>Picus chlorolophus</i>	R	U	
12.	Scaly Bellied Woodpecker	<i>Picus squamatus</i>	R	O	
13.	Grey Headed Woodpecker	<i>Picus canus</i>	R	U	
Family: Megalaimidae					
14.	Great Barbet	<i>Megalaima virens</i>	R	U	
15.	Coppersmith Barbet	<i>Megalaima haemacephala</i>	R	C	
16.	Lineated Barbet	<i>Megalaima lineata</i>	R	C	
17.	Brown headed Barbet	<i>Megalaima zeylanica</i>	R	O	
Family: Bucerotidae					
18.	Indian Grey Hornbill	<i>Ocyroceros birostris</i>	R	C	River lapwing
19.	Oriental Pied Hornbill	<i>Anthracoceros albirostris</i>	R	U	
20.	Great Pied Hornbill	<i>Buceros bicornis</i>	R	R	
Family: Upupidae					
21.	Common Hoopoe	<i>Upupa epops</i>	R	O	
Family: Coraciidae					
22.	Indian Roller	<i>Coracias benghalensis</i>	R	U	
23.	Dollarbird	<i>Eurystomus orientalis</i>	R	R	
Family: Alcedinidae					
24.	Common Kingfisher	<i>Alcedo atthis</i>	R	U	
25.	Crested Kingfisher	<i>Megaceryle lugubris</i>	R	U	
26.	Stork Billed Kingfisher	<i>Halcyon capensis capensis</i>	R	U	
27.	White Throated Kingfisher	<i>Halcyon smyrensis</i>	R	C	
Family: Meropidae					
28.	Green Bee Eater	<i>Merops orientalis beludschicus</i>	R	C	
29.	Chestnut headed Bee Eater	<i>Merops leschenaulti</i>	R	O	
30.	Blue Bearded Bee-Eater*	<i>Nyctyornis athertoni</i>	R	O	
31.	Blue Tailed Bee-Eater	<i>Merops philipinus</i>	M	O	
Family: Cuculidae					
32.	Pied Cuckoo	<i>Clamator jacobinus</i>	M	U	Dollar bird
33.	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	R	U	
34.	Indian Cuckoo	<i>Cuculus micropterus</i>	R	U	
35.	Asian Koel	<i>Eudynamys scolopacea</i>	R	U	
36.	Drongo Cuckoo	<i>Surniculus lugubris</i>	M	R	
Family: Centropodidae					
37.	Greater Coucal	<i>Centropus sinensis</i>	R	C	
38.	Lesser Coucal	<i>Centropus bengalensis</i>	R	U	
Family:Psittacidae					
39.	Alexandrine Parakeet	<i>Psittacula eupatria</i>	R	U	
40.	Rose Ringed Parakeet	<i>Psittacula krameri</i>	R	C	
41.	Plum headed Parakeet	<i>Psittacula cyanocephala</i>	R	U	
42.	Red Breasted Parakeet	<i>Psittacula alexandri</i>	R	C	

	Family: Apodidae				
43.	House Swift	<i>Apus affinis</i>	R	U	
	Family: Strigidae				
44.	Brown Fish Owl	<i>Ketupa zeylonensis</i>	R	U	
45.	Jungle Owlet	<i>Glaucidium radiatum</i>	R	U	
45.	Spotted Owlet	<i>Athene brama</i>	R	U	
	Family: Caprimulgidae				
46.	Grey Nightjar	<i>Caprimulgus indicus</i>	R	DD	
47.	Savanna Nightjar	<i>Caprimulgus affinis</i>	R	DD	
	Family: Columbidae				
48.	Rock Pigeon	<i>Columba livia</i>	R	C	
49.	Yellow Footed Green Pigeon	<i>Treron phoenicoptera</i>	R	U	
50.	Pin Tailed Green Pigeon	<i>Treron apicauda</i>	R	R	
51.	Laughing Dove	<i>Streptopelia senegalensis</i>	R	U	
52.	Spotted Dove	<i>Streptopelia sinensis</i>	R	C	
53.	Oriental Turtle Dove	<i>Streptopelia orientalis meena</i>	R	O	
54.	Emerald Dove	<i>Chalcophaps indica</i>	R	U	
	Family: Rallidae				
55.	White Breasted Waterhen	<i>Amaurornis phoenicurus</i>	R	C	
	Family: Tringidae				
56.	Wood Sandpiper	<i>Tringa glareola</i>	R	O	
57.	Common Sandpiper	<i>Actitis hypoleucos</i>	R	O	
	Family- Burhinidae				
58.	Eurasian Thick Knee	<i>Burhinus oedicnemus</i>	R	DD	
	Family: Charadriidae				
58.	Red-Wattled Lapwing	<i>Vanellus indicus</i>	R	C	
59.	River Lapwing	<i>Vanellus duvaucelii</i>	R	DD	
	Family: Accipitridae				
60.	Black Shouldered Kite	<i>Elanus caeruleus</i>	R	DD	
61.	Black Kite	<i>Milvus migrans</i>	R	U	
62.	Long Billed Vulture	<i>Gyps indicus</i>	R	R	
63.	Red Headed Vulture	<i>Sarcogys calvus</i>	R	R	
63.	Crested Serpent Eagle	<i>Spilornis cheela</i>	R	U	
64.	Shikra	<i>Accipiter badius</i>	R	U	
65.	Besra Sparrowhawk	<i>Accipiter virgatus</i>	R	O	
66.	Oriental Honey Buzzard	<i>Pernis ptilorhyncus</i>	R	U	
67.	Mountain Hawk Eagle*	<i>Spizaetus nipalensis nipalensis</i>	R	DD	
	Family: Phalacrocoracidae				
68.	Little Cormorant	<i>Phalacrocorax niger</i>	R	DD	
	Family: Ardeidae				
69.	Little Egret	<i>Egretta garzetta</i>	R	DD	
70.	Cattle Egret	<i>Bubulcus ibis</i>	R	DD	
71.	Indian Pond Heron	<i>Ardeola grayii</i>	R	U	
72.	Little Heron	<i>Butorides striatus</i>	R	O	
	Family Threskiornidae				
73.	Black Ibis	<i>Pseudibis papillosa</i>	R	DD	
	Family: Ciconidae				
74.	Woolly Necked Stork	<i>Ciconia episcopus</i>	R	O	
	Family: Pittidae				
75.	Indian Pitta	<i>Pitta brachyura</i>	R	U	
	Family: Irenidae				
76.	Golden Fronted Leafbird	<i>Chloropsis aurifrons</i>	R	U	
	Family: Aegithininae				
77.	Common Iora	<i>Aegithina tiphia</i>	R	U	
	Family: Laniidae				
78.	Long tailed Shrike	<i>Lanius schach</i>	R	O	
	Family: Corvinae				
79.	House Crow	<i>Corvus splendens</i>	R	U	
80.	Large Billed Crow	<i>Corvus macrorhyncos</i>	R	C	
81.	Rufous Treepie	<i>Dendrocitta vagabunda</i>	R	C	
82.	Grey Treepie	<i>Dendrocitta formosae</i>	R	O	
83.	Common Green Magpie	<i>Cissa chinensis</i>	R	O	
84.	Red-Billed Blue Magpie	<i>Urocissa erythrorhcha</i>	R	U	
	Family Artamidae				
85.	Large Cuckooshrike	<i>Coracina macei</i>	R	O	
86.	Black Headed Cuckooshrike	<i>Coracina melanopectera</i>	R	O	
	Family: Oriolidae				
87.	Eurasian Golden Oriole	<i>Oriolus oriolus kundoo</i>	M	U	
88.	Black Hooded Oriole	<i>Oriolus xanthomus</i>	R	U	
	Family: Pericrocotus				
89.	Scarlet Minivet	<i>Pericrocotus flammeus</i>	R	U	
90.	Rosy Minivet	<i>Pericrocotus roseus</i>	R	O	

Grey capped woodpecker



White capped redstart



Oriental honey buzzard



Common hawk cuckoo



91.	Small Minivet	<i>Pericrocotus cinnamom pallidus</i>	R	U
92.	Bar Winged Flycatcher Shrike Family: Dicruridae	<i>Hemipus picatus</i>	R	U
93.	Black Drongo	<i>Dicrurus macrocerus</i>	R	C
94.	Bronzed Drongo	<i>Dicrurus aeneus</i>	R	O
95.	White Bellied Drongo	<i>Dicrurus caerulescens</i>	R	U
96.	Greater Racket Tailed Drongo	<i>Dicrurus paradiseus</i>	R	U
97.	Spangled Drongo Family: Cinclidae	<i>Dicrurus hottentottus</i>	R	C
98.	Brown Dipper Family Monachinii	<i>Cinclus pallasii</i>	R	O
99.	Black Naped Monarch	<i>Hypothymis azurea</i>	R	U
100.	Asian Paradise Flycatcher Family: Paridae	<i>Terpsiphone paradisi</i>	R	U
101.	Great Tit	<i>Parus major</i>	R	U
102.	Green Backed Tit	<i>Parus monticolus</i>	R	O
103.	Black Lored Tit Family: Sittidae	<i>Parus xanthogenys</i>	R	O
104.	Velvet Fronted Nuthatch	<i>Sitta frontalis</i>	R	U
105.	Chestnut bellied Nuthatch Family: Pycnonotidae	<i>Sitta castanea</i>	R	U
106.	Black Crested Bulbul	<i>Pycnonotus melanicterus flaviventris</i>	R	U
107.	Red Whiskered Bulbul	<i>Pycnonotus jocosus</i>	R	C
108.	Red Vented Bulbul	<i>Pycnonotus cafer</i>	R	U
109.	Ashy Bulbul	<i>Hemixos flavala</i>	R	O
110.	Black Bulbul	<i>Hypsipetes leucocephalus</i>	R	O
111.	Himalayan Bulbul Family: Muscicapidae	<i>Pycnonotus leucogenys</i>	R	U
112.	Tickell's Blue Flycatcher	<i>Cyornis tickelliae</i>	R	U
113.	Hill Blue Flycatcher	<i>Cyornis banyumas</i>	R	O
114.	Pale Blue Flycatcher	<i>Cyornis unicolor</i>	R	R
115.	Small Niltava	<i>Niltava macgrigoriae</i>	R	O
116.	Verditer Flycatcher Sub-Family: Turdinae	<i>Eumyias thalassina</i>	R	U
117.	Blue Whistling Thrush	<i>Myophenus caeruleus</i>	R	C
118.	Orange Headed Thrush	<i>Zoothera citrina citrina</i>	R	O
119.	Eurasian Blackbird Tribe Saxicolini	<i>Turdus merula</i>	R	O
120.	White Rumped Shama	<i>Copsychus malabaricus</i>	R	U
121.	Oriental Magpie Robin	<i>Copsychus saularis</i>	R	C
122.	Indian Robin	<i>Saxicoloides fulicata</i>	R	U
123.	Plumbeous Water Redstart	<i>Rhyacornis fuliginosus</i>	R	O
124.	White Capped Water Redstart Sub-Family: Garrulacinae	<i>Chaimarrornis leucocephalus</i>	R	O
125.	White Throated Laughingthrush	<i>Garrulax albogularis</i>	R	O
126.	White Crested Laughingthrush Tribe-Timaliini	<i>Garrulax leucolophus</i>	R	U
127.	Tawny Bellied Babbler	<i>Dumetia hyperythra</i>	R	O
128.	Large Grey Babbler	<i>Turdoides malcolmi</i>	R	U
129.	Jungle Babbler Family: Nectariniidae	<i>Turdoides striatus</i>	R	C
130.	Thick Billed Flowerpecker	<i>Dicaeum agile</i>	R	U
131.	Pale Billed Flowerpecker	<i>Dicaeum erythrorhyncos</i>	R	O
132.	Purple Sunbird	<i>Nectarinia asiatica</i>	R	C
133.	Mrs.Goulds Sunbird	<i>Aethopyga gouldiae</i>	R	R
134.	Crimson Sunbird Family: Sylviinae	<i>Aethopyga siparaja</i>	R	U
135.	Ashy Prinia	<i>Prinia socialis</i>	R	U
136.	Common Tailorbird Family: Zosteropidae	<i>Orthotomus sutorius</i>	R	U
137.	Oriental White Eye Family: Passerinae	<i>Zosterops palpebrosus</i>	R	O
138.	House Sparrow	<i>Passer domesticus</i>	R	U
139.	Chestnut Shouldered Petronia Family- Mottacillinae	<i>Petronia xanthocollis</i>	R	O
140.	White Browed Wagtail	<i>Motacilla maderaspatensis</i>	R	U
141.	Grey Wagtail Sub-Family- Ploceinae	<i>Motacilla cinerea</i>	R	U
142.	Streaked Weaver Sub-Family-Estrildinae	<i>Ploceus manyar</i>	R	DD
143.	Scaly Breasted Munia	<i>Lonchura punctulata</i>	R	DD

Bar winged flycatcher shrike



Brown fish owl



Indian roller



Scarlet minivet (female)



5. Note on the Burmese Python (*Python molurus bivittatus*)

Trishant Simlai and Shraddha Rathod

Kuhl (1820) was the first worker to consider Burmese Python as a distinct species. Since its discovery, the exact status of the Burmese Python has been a topic of debate. Initially it was thought to be synonymous with the Indian Python (*Python molurus molurus*) but later Mertens (1930) elevated its status to a valid subspecies of the *Python molurus*. Since then, this subspecies status of Burmese Python (*Python molurus bivittatus*) has been accepted by all herpetologists.

The Burmese Python is one of the largest snake species in Asia. Though they are adaptable they require large undisturbed areas to survive. They inhabit estuarine mangrove forests, tropical lowlands, rainforests and grasslands. They prey on mainly warm blooded animals like rodents, birds, civets, small deer and wild boar.

Distribution: The subspecies has been reported from throughout southeast Asia from countries like China, North-east India, Nepal, Myanmar and Indonesia. In India it has been reported from Arunachal Pradesh, Assam and other north-eastern states. This record represents the second authentic report of this subspecies from Uttarakhand state.

Diagnosis of *Python molurus bivittatus*: Scale counts are the most reliable method to distinguish the Indian Rock Python from the Burmese Python. Burmese Python can be distinguished from the Indian Rock Python by the following set of characters:

	<i>Python molurus bivittatus</i>	<i>Python molurus molurus</i>
Scales rows around the body	60-75	60-75
No. of ventral scales	245-270	253-270
Anal scales	1	1
No. of Subcaudal scales	58-73, paired	58-73, paired
Supralabial scales	11-13, separated from eye by Suboculars	11-13 (6th or 7th touching eye).

Field diagnosis/ Identification: Small subocular scales present below the eye and between the supralabials in *Python molurus bivittatus*, these scales are absent in *Python molurus molurus*.

Natural History Notes:

An individual of *P.m. bivittatus* was spotted near house adjoining a field at 1700 hrs. The snake was spotted by locals when the individual attacked the chicken in the village. Consequently the snake was beaten with sticks. Authors rushed to locations after they were informed by the locals. The snake was safely caught in a gunny bag and was examined later. The snake measured approximately 10 feet (snout to vent) and was sexed out as a female. According to the locals, the species is a common occurrence in the villages and primarily preys on chickens, though there are records of it taking larger mammals like goats.

Historic reports suggest that *Python molurus molurus* is a sympatric to *Python molurus bivittatus* in this area. Further studies elucidating intraspecific competition, breeding behaviours and other ecological aspects are desirable. The results obtained from such studies may be helpful in long term survival of the subspecies.

References:

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Burmese python



Indian rock python



6. Partial list of butterflies observed in Kyari

Manas Kulkarni

The forests of Corbett are homes to a large number of butterflies. They get all that they require - variety of host plants, flowering plants and sufficient moisture. Undermentioned is a partial list of butterflies that we observed. It would be a good idea to study these insects on a year round basis.

Partial list:

Family: Papilionidae (Swallowtails)

Subfamily: Papilioninae

1. Spot swordtail (*Graphium nomius*)
2. Common mormon (*Papilio polytes*)
3. Lime butterfly (*Papilio demoleus*)

Family: Pieridae (Whites and yellows)

Subfamily: Coliadinae

1. Common grass yellow (*Eurema hecabe*)
2. Mottled emigrant (*Catopsilia pyranthe*)

Subfamily: Pierinae

1. Common jezebel (*Delias eucharis*)

Family: Lycaenidae (Blues)

Subfamily: Theclinae

1. Common flash (*Rapala nissa*)
2. Lesser grass blue (*Zizina otis*)

Family: Nymphalidae (Brush-footed)

Subfamily: Libytheinae

1. Striped Tiger (*Danaus genutia*)
2. Plain tiger (*Danaus chrysippus*)
3. Glassy tiger (*Parantica aglea*)
4. Common crow (*Euploea core*)

Subfamily: Limenitinae

1. Common Lascar (*Pantoporia Hordonia*)
2. Common sailor (*Neptis hylas*)
3. Barronet (*Euthalia nais*)

Subfamily: Nymphalinae

1. Painted lady (*Vanessa cardui*)
2. Yellow pansy (*Junonia hierta*)
3. Chocolate pansy (*Junonia iphitia*)
4. Lemon pansy (*Junonia lemonias*)
5. Danaid eggfly (*Hypolimnas misippus*)



After mating, the butterflies lay their eggs on their “host” plants, like Callatropis. The larvae born from these eggs are called caterpillars. These are tiny worm like and feed on the leaves of the host plant and then undergo metamorphosis to become beautiful butterflies.



7. Some interesting insects observed

Mayur Deshpande

1. ASSASSIN BUG

Scientific classification : Phylum: Arthropoda, Class: Insecta, Order: Hemiptera, Suborder: Heteroptera, Superfamily: Cimicomorpha, Family: Reduviidae

Adult assassin bugs often range from 4 to 40 mm. They most commonly have an elongated head with a distinct narrowed neck, long legs, and a prominent, segmented tube for feeding (rostrum). Most species are dark in color with hues of brown, black, red, or orange. The most distinctive feature of the family is that the tip of the rostrum fits into a groove in the prosternum, where it is rasped against ridges there (a stridulitrum) to produce sound, a tactic often used to intimidate predators. If harassment continues, they can use their rostrum to deliver a painful bite which in some species can be medically significant.

They use the long rostrum to inject a lethal saliva that liquefies the insides of the prey, which are then sucked out. The legs of some of these bugs are covered in tiny hairs that serve to make them sticky to hold onto their prey while they feed. The saliva is commonly effective at killing substantially larger prey than the bug itself. As nymphs, some species will cover and camouflage themselves with debris, or the remains of dead prey insects. Some species have been known to feed on cockroaches or bedbugs (in the case of the masked hunter) and are regarded in many locations as beneficial. Some people breed them as pets and for insect control.

2. DAMSELFLY SPECIES

Scientific classification : Phylum: Arthropoda, Class: Insecta, Order: Odonata

Damselflies undergo incomplete metamorphosis, with an aquatic nymphal stage. The female lays eggs in water, sometimes in underwater vegetation, or high in trees in bromeliads and other water-filled cavities. Nymphs are carnivorous, feeding on daphnia, mosquito larvae, and various other small aquatic organisms. The gills of damselfly nymphs are large and external, resembling three fins at the end of the abdomen. After moulting several times, the winged adult emerges and eats flies, mosquitoes, and other small insects. Some of the larger tropical species are known to feed on spiders, hovering near the web and plucking the spider from its nest

3. PAINTED GRASSHOPPER

Scientific classification : Phylum: Arthropoda, Subphylum: Hexapoda, Class: Insecta, Order: Orthoptera,

Grasshoppers have antennae that are almost always shorter than the body (sometimes filamentous), and short ovipositors. Those species that make easily heard noises usually do so by rubbing the hind femurs against the forewings or abdomen (stridulation), or by snapping the wings in flight. Tympana, if present, are on the sides of the first abdominal segment. The hind femora are typically long and strong, fitted for leaping. Generally they are winged, but hind wings are membranous while front wings (tegmina) are coriaceous and not fit for flight. Females are normally larger than males, with short ovipositors. Males have a single unpaired plate at the end of the abdomen. Females have two pairs of valves (triangles) at the end of the abdomen used to dig in sand when egg laying.

4. DUNG BEETLES

Scientific classification : Phylum: Arthropoda, Class: Insecta, Order: Coleoptera, Superfamily: Scarabaeoidea

Dung beetles are beetles that feed partly or exclusively on feces. This beetle can also be referred to as the scarab beetle. Dung beetles are usually round with short wing covers (elytra) that expose the end of the abdomen. They vary in size from 5 to 30 mm (0.2 to more than 1 inch) and are usually dark in colour, although some have a metallic lustre. In many species, there is a long, curved horn on the top of the male's head. Dung beetles can eat more than their own weight in 24 hours and are considered helpful to humans because they speed up the process of converting manure to substances usable by other organisms.

Many dung beetles, known as rollers, are noted for rolling dung into spherical balls, which are used as a food source or brooding chambers. Other dung beetles, known as tunnelers, bury the dung wherever they find it. A third group, the dwellers, neither roll nor burrow: they simply live in manure.



8. Some field notes on the plants observed

Amita Nagarkatti

1) *Asclepias curassavica*

Family- Asclepiadaceae (milkweed family)

- Native of tropical America, naturalized throughout Himalayas upto 1500m. Seen here on and near river beds khichdi river, Dabka River
- Erect shrubs, perennial weed grows upto 1m. the leaves are oblong flowers-orange red. Flowers throughout the year.

2) *Wrightia arborea*

Family-Apocynaceae (oleander family)

- A deciduous tree grows up to 10m, with white milky juice and with twigs. Woolly – hairy when young. Leaves elliptic, wooly-hairy on both sides. Lateral nerve prominent, seen upto 1000m.
- Flowers white fading yellow in branched terminal clusters- fragrant
- Seen near canal beyond Dabka river.

3) *Acacia catechu*

Family- Leguminosae

- Local name- Khair
- Found in drier regions of the sub Himalayan tract- low altitudes from the Terai to about 900m..
- Seen in association with *Bombax cecilia* (simal) and *Dalbergia sisoo*.
- Deciduous moderate size. feathery crown, branchlets with pairs of short curved nearby black spines.
- Bark rough, dark-grey brown tends to peel off in narrow strips.
- Leaves compound (bi-pinnate) alternately arranged 10-17 mts long divided into 20-60 pairs of pinnate, each of which is again divided into 30-50 pairs of very small leaflets.
- Flowers either in spikes or in pom poms,
- Wood used for agricultural implements, house building, etc.
- Good fuel. pods relished by wild animals, wood chips boiled to make catch black gum resin, thick and syrupy used as medicine for sore throat cooling tonic. Also used in chewing with betel leaf.

4) *Adina cordifolia*

Family- Rubiaceae

Local name- Haldu

- Found in deciduous forest fairly common in the terai upto 1000m.
- Usually associated with Sal
- Large deciduous tree with thick spreading crown, trunk often fluted and occasionally buttressed, grey or brownish grey peels off in patches leaving distinctive indentations.
- Wood-yellow in color. Used for planks wood powder used to adulterate haldi, leaves used as fodder, and young trees suffer considerable damage by being browsed by goats and deer.

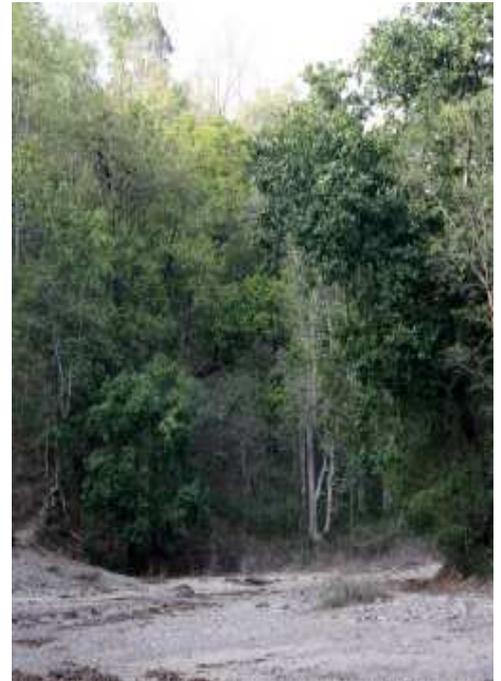
5) *Aegle marmelos*

Family- Rutaceae

Local name-Bel

- Found in terai regions upto 1200 mts.
- Moderate sized, deciduous tree, branches have straight spines.
- Leaves aromatic, sweet- scented greenish white flowers about 2 cms diameter, between March- May. In short stalked branches. They attract many bees.
- Ripe fruit 5 cm or more in diameter with hard woody shell and inside a mass of thick sweet orange yellow pulp with seeds embedded.
- The tree has been worshiped since ancient times, Identified with Goddess Laxmi. Leaves used in religious ceremonies especially worship of Shiva.

Moist deciduous forest



Sal tree



Monoculture teak plantation



Studying the flora



6) *Bombax ceiba*

Family- Bombaceae

Local name-Simal

- Found upto 1300 mts. Grows in association with Sal, near the river bank.
- Very large deciduous, grows upto 40 mts.
- Young stem and branches are covered in large conical prickles.
- Bright red fleshy flowers appear in March. Mostly on leafless trees.
- Birds are attracted to them.
- Pods 12-17 cms long, oval seeds surrounded by thick masses of long silky hair/ floss. The floss is used for stuffing for pillows and cushions.
- Belief about tree is that evil spirits live in it and its thorns are used in hell to prick the bodies of sinners, so it is wise to avoid the tree at night.

Bael tree



7) *Cassia fistula*

Family-Legumonoceae

Local name-Raj-briksha, Amaltas, Laburnum

- Found in low altitudes from terai upto 1200 mts,
- Small to moderate size deciduous although never quite leafless. Leaves compound, divided into 4/6 pairs of large oval shaped leaflets.
- Bright yellow flowers, like hanging lanterns. April- may.
- Pods 30 cms cylindrical 2-3 cms in diameter. They are smooth, hard dark brown when fully ripe, pods have laxative property.

8) *Ficus sp.*

Family- Moraseae Local name- Pipal, banyan

10) *Vitex negundo*

Family-Verbenaceae

Local name- Nirgudi, Simalu

- Seen growing along roadsides and borders of fields.
- A long shrub 2-4 mts high, leaves opposite, digitately compound 3-5 leaflets. White tomentose beneath.
- Flowers in bunches (cymes) arranged in elongate terminal branch.
- It is used extensively for various ointments rheumatism and swellings of joints. Leaves keep grains free from insects. Smoked like tobacco for headaches. The twigs are used as tooth brushes by the villagers.

Bombax - semul tree



11) *Ziziphus mauritiana*

Family- Rhamnaceae

Local name- Ber

- Seen throughout upto 1200 m. A much branched shrub 0.6-1.3 m. high. Leaves elliptic ovate- oblong 3-5 cms long green glabrous above, white buff.
- Fruits are edible and rich in vit. C.
- Bark used for tannin and leaves as fodder. Serves as host for lac insect
- In the forest beds most leaves were eaten by caterpillars.

12) *Jacaranda mimosifolia*

Family- Bignoniaceae

Local name- Jacaranda

- Originally from South and Central America, introduced into Asia, seen from the Terai upto 1600 mts. Seen along roadsides, deciduous grows to height of 12 mts.
- Leaves oppositely arranged on twigs 25 cms long compound with 14-30 pairs of small oblong leaflets. Flowers blue- violet, bell like and honey scented appear between April and May, very conspicuous and attractive.
- Pods round, woody, flattened each one contains numerous broad winged seeds.

Strangler fig



13) *Mallotus philippensis*

Family-Euphorbiaceae

Common name-Rohini

- Occurs on outer hills of sub Himalayan track upto 1600mts.
- Small evergreen tree usually growing to 6 or 8 mts in height.
- Leaves alternate oval-oblong or even lance shape, pointed tips.
- Male female flowers borne on separate trees, male flowers are long spikes, grow together in clusters where as female flowers are short spike and grow singly.

- Fruits three lobed capsules clustered together on erect stalks and are covered with bright crimson powder. This makes the tree easy to recognize when the fruit is ripe
- Elephants favorite food hence massive destruction of these trees was seen.
- Seed covering used to make red kumkun-tilak called "roli" locally.

Asclepias - Haldi Kumkum



14) *Shorea robusta*

Family-Dipterocarpaceae

Local name-Sal

- Seen at lower altitudes from Terai to 1200mts.
- Large deciduous seldom becoming leafless, grows upto 25 mts. May grow upto 30-40 mts. Thining foliage gives it a characteristic appearance
- Simple leaves, alternately arranged, tough and leathery, very shiny when mature, oval or oblong in shape.
- Stalk less pale yellow flower appear between March and April borne in hanging bunches either from end of twigs or leaf axils. The fruit is small (1cm diameter) oval with a long spike. It is fleshy covered with a white bloom, has five wings each about 6 cms long ,broad at the top and pointed at the base.
- In June the trees are conspicuous with masses of hanging bunches of brown fruit.
- Sal is an important timber tree used for construction, railway sleepers and wagons and in temples for carvings and decorative beams and doors. Excellent for wildlife as even though it is deciduous it is rarely leafless.

Wrightea arborea



15) *Syzygium cumini*

Family-Myrtaceae

Local name-Jamun

- Occurs from Terai upto 1500mts. especially along stream banks and damp situations. Often found with Sal on slightly drier sites
- Large evergreen tree with dark green thick much branched crown
- Oppositely arranged leaves 7-15 mts long, oval-oblong or oblong-lance like. Pointed leathery tough and smooth and shiny on the top.
- Tassel like white flowers fairly small, sweet smelling, arranged in bunches of 3.
- Fruit-smooth, round, shiny, berry which is purple-black color when ripe. It has a thin skin and succulent flesh which is edible. Berries ripen between June to august. When we saw it in June it was not yet fruiting as the fruiting goes by the seasons of western rains starting in Kerela and reach north much later,
- Attracts many birds, grey hornbill, red cheeked bulbul, large green barbet,
- Bark powder used as fish poison. Fruit also has medicinal property.

16) *Terminalia alata (tomentosa)*

Famiy- Combretaceae

Local name- Saj (crocodile bark tree) asna

- Found from Terai upto 1300mts. Grows with Sal.
- Tall tree, deciduous, bark with grey blackish deep vertical fissures, cracked transversely appearing like a crocodile's back.
- Large leaves 12-26 cms long, elliptical, leathery, smooth on top and densely hairy on the under side.
- Fruit is hard 2.5 cms long with 5 broad striated wings. Much of the fruit is destroyed by parakeets and many unripe ones fall on the ground where they turn brown giving the impression of being ripe.
- The leaves are good fodder and often burnt to make ash fertilizer.

Rohini tree

Gunja seeds



9. On the Tiger Trail

Anirudh Chaoji

Growls were a loud and clear message that the human presence was sensed. A few more repeated growls from the lantana undergrowth meant that Trishant, Anish and Naveen had to move on immediately.

It was just about 0440 hrs in the early dawn light. The three were tracking a pair of tigers as a part of the 5th edition of the Pugmarks Volunteer Training Programme on the fringes of the Corbett National Park. This was a joint Pugmarks – Wildrift initiative for studying the habits of leopards and tigers – mainly by tracking the indirect signs left behind by the two super cats.

Our team reached the base camp in the heart of the legendary Jim Corbett's most loved forests. Having grown up on his inspiring works and having explored many of India's finest wilderness areas, this chance to explore the fringe areas of Corbett Tiger Reserve was something we were all eagerly looking forward to. Naveen, our local host from Wildrift had already chalked out the exploration plan based on our discussions. This area was in fact chosen from a host of options. Tiger movement was fairly frequent and leopard activity was an everyday affair. Just a week ago, a calf was lifted from a neighbouring cow shed. Dogs were more regular on the leopard's menu card and its pugmarks dotted the soft mud of the village roads every morning.

Pugmarks of tigers and leopard were good indicators of their activity



Early next morning, our group started off with a very interesting birding session with birds like drongo cuckoos, lineated barbets, and the honey buzzard impressing us to no ends. Soon we were led into the narrow Bhadragadi watershed along the tiny perennial stream that winds through a moist deciduous forest towards the Bhagwati Vanadevi temple inside the forest. In fact most of our forests form important watersheds for the major Indian rivers and their tributaries, with over 350 of them originating from such tiger forests. These forests help in soaking up the rain water and then regulate its flow over the year and also prevent the loss of soil to erosion. Today these tiger's forests comprise less than 5% of our land yet invite a chunk of discussions for sharing it with humans. The ultimate solution instead would lie in using the remaining 95% of the land wisely. We should not forget that by protecting the forest from logging, over grazing, forest fires and preventing rampant conversion to agriculture, we are actually ensuring the water security of the 110 crores Indians.

Just as the lead group with Trishant reached the perennial stream, they were greeted by alarm calling sambar deer. Here was a small pool which showed signs that an animal had just moved out of it. And all around were fresh and a little older set of tiger pugmarks. Closer observation pointed to two tigers and not just one- a female and a male, both of whom had left the scene just a while ago. Both these animals were really young with a pugmark length of 14 cms. But now what became more interesting was that with these siblings, who seemed to be barely 2 years old, there were no accompanying pugmarks of their mother. It now was apparent that they were alone and on their own. The stride of the male cub, the distance between two same feet impressions – rear left to the next rear left was now 120 cms. Huge adult male tigers like B2, Bokha or Charger would have a stride of around 160 cms. and a pugmark length of around 16 cms!!!

The mother, it seemed must have nurtured them for around 20 months. During this period, the mother would never have come into estrus nor would she have mated with another male tiger. So now was the time when the cubs were asked to make way so that she would be ready to mate again. The cubs at this stage must have moved on – in their mother's own 'home range'. This temporary range of the cubs is called Natal range, where both would remain together. They had also interestingly started their life beyond their mother's shadow- there was a broken and partially eaten rear leg of a spotted deer in the vicinity.

However, very soon their mother would have her next litter and that would be the time for the male cub to leave the area for good – to try to establish his own 'territory'. The female cub on the other hand may be allowed to live in close proximity of the mother, who may actually make room for the daughter – yielding a portion of her range.

The cubs were already doing their early homework well. Like big tigers, they had started marking their territory by backing up against tree stumps, bushes and rocks and squirting a fine misty spray of urine and scent. These deposits solidified – emitting scent signals which would last for several days. To us the smell only meant that a tiger had passed that route. But to a different tiger, it would provide all the details of the territory owner, gender, age, time of passage, reproductive readiness and every other detail that might be necessary to be communicated to the visiting tiger, which could then choose to trespass or leave the area.

Crested serpent eagle keeping a watch



However, they still needed to pick up all the skills of the art of communication, like covering up their droppings with soil. The scat is another strong source of the olfactory message and the covering up with soil must probably be ensuring that the moisture is retained for longer periods.

Later, on our return journey from the Vandevi Temple, we started to prepare the Plaster of Paris (PoP) casts of the pugmarks impressions in the soil. This is an age old method of differentiating tigers. However, newer technologies are now replacing this method to ensure the exact identities of each individual. But nevertheless, for our area specific work, this method would suffice at present.

Even as we were waiting for the PoP castings to dry up, there was a sudden commotion in the forest downstream and the spotted deer started calling out in alarm. The two tigers, it seems had taken a detour after leaving the area. And now, after a noon siesta had gone further downstream from where we all were sitting. The deer, which were already there on the water, must have been startled by their sudden appearance on the stage. We waited for further signs of the tiger movement, but after a while the alarm calling stopped as abruptly as it had started.

We returned to the campsite excited with the new experience. To those of us who had been through this before, it was just another amazement at this cat's super hearing ability inside a forest, which helped it track all our movements. We were left only deciphering the observations.

That night, we went in search of creepy crawlies on the dry bed of Khichdi River behind our campsite. It was already past ten and everything around was silent. Just as we were returning to the campsite, we suddenly noticed that a female leopard had walked on our shoe marks all along the path, just in the last half an hour – and here started the second pugmarks trail of the day. The leopard had probably entered the jungle path just ahead of us and then crossed over to the agricultural fields beyond, where the dogs soon started barking. We realized that the spotted cat was now just ten minutes ahead of us. We continued following her pugmarks when we suddenly came face to face with a wild boar – hey wait – it was a huge porcupine looking at us with its quills standing erect. It allowed us a good glimpse and then made good its escape.

I was then explaining the difference between the dog barks on sensing and then actually seeing the leopard, and all of a sudden the dog in the field just behind us changed its barking into yelping as it ran inside the house. The leopard had reached the farmer's house in search of its prey – a dog or a calf, bringing out the farmer swearing and shouting. However, the leopard gave us and the farmer a slip and disappeared into the adjoining fields. The leopard however gave the dogs a sleepless night and their barking ceased only with day break.

The next afternoon was a super interesting one!!! The same farmer, whose dog had attracted the leopard's attention the night before now had a hen tempting an Indian rock python, (which eventually turned out to be a Burmese python). Unbelievable as it may sound, the farmer's family rescued the bird without injuring the python. Trishant, Shraddha and Sameer managed to bag the python, which was released into the forest that night. The villagers seemed to be quite unperturbed by the presence of all the wildlife around them. This was contrary to our past

These simple people have been co-existing with the animals



The landscape of the project area. Corbett once roamed this very land.



An oriental pied hornbill shuttles across the forest



experiences at Ranthambore, Navegaon and Bhimashankar forests. Here, at Kyari, the people did not see the forest and its creatures as a problem but as a give and take proposition. They seem to have taken into their stride all the troubles that the elephants, boars, porcupines and other crop raiders gave them occasionally. Very important was the understanding that the forests provided water for all their needs.

What probably makes this area different from the others is the initiative taken by the various departments and organizations. Most of the villagers have been provided with subsidized bio gas units, thereby reducing the need to cut wood from the forest and this had reduced their confrontations with the forest guards. The forest department had also helped in setting up electric fences around the fields thereby considerably reducing the impact of the raiding elephants, deer and boars. Another important factor in reducing the antagonism towards the forest is the issue of receiving timely compensation for the cattle killed by leopards and tigers. The delay in receiving the compensation from the forest department has always been an issue of contention everywhere. Around Corbett Tiger Reserve, there are organizations like WWF and Corbett Foundation that have stepped in to fill in just this gap. Though their compensation is lower, it is the timely disbursement that reduces the antagonism towards the predators. These are some very simple steps that can be replicated elsewhere and thereby reduce the man–animal conflicts.

On our way back after releasing the python in the jungle, we were now walking through a mango plantation on a moonless night. Sameer and I were bringing the rear of the group when suddenly Sameer noticed a very fast movement just behind us. However in the dark, we could not ascertain the animal and in a very short while we heard the plantation owner shouting bagh, bagh... announcing the presence of a leopard. A few shots were fired from the unique Gandhi bandook, an interesting contraption which has a small packet of gunpowder held between a pair of tongs. This apparatus is hammered on a hard surface like a rock giving out a loud sound, though no bullet is fired – a very non-violent way of scaring away the animals and hence the name!!!



Monitor lizard explores the forest floor

Trishant in the meanwhile had taken a small group of people on the upper road and in his torch light, standing on the road was a leopard! The feline beauty slipped away into the bushes as silently as only it can. We returned to the campsite to notice that our leopard had already passed the track ahead of us and the dogs were already barking hysterically.

Next morning was the very special trek to Sitabani all along the Khichdi River, upstream of the famous irrigation canals built during Jim Corbett's times. The construction quality and engineering design was so good then that the complete system still operates efficiently and irrigates the agricultural fields. The trek route itself passed through the dense moist deciduous forests and eventually crossed the knee deep waters of the river over three dozen times. As we entered the forest, we were greeted by the pugmarks of the tiger siblings who had covered a long distance of the riverside path at night. This river valley was in fact very close to the Bhadragadi valley, where we had come across their pugmarks just a couple of days ago. A little ahead, we met a Gujjar buffalo herder who, in a way, certified our observations. He talked of a tigress with two big cubs, which she had been bringing up in this part of the forest till about a month ago. He had frequently been coming across the trio but his cattle were unharmed. He believed that if the herder was strong enough, the big cat would keep a distance- interesting!!!

Manas and I were now ahead of the group and wading through a knee deep stretch to appreciate a crested serpent eagle basking in the early morning light. We walked slowly to get better pictures of it when it flew ahead to a tree further upstream. I had the pictures I wanted and Manas walked ahead and kept clicking. Just as he returned to join the group, a barking deer started to call out loud – and very close. We rushed to inspect the site and stumbled upon pugmarks of a female leopard, which apparently left her resting site under a small bush – very close to where both of us were photographing the eagle. What was interesting was that this cat was so confident of her camouflage that she remained hidden initially and left only after the area was clear when we had passed her a second time while returning to the group.

The trek to Sitabani proved to be the best experience for the wildlifer in me – with a strong animal presence indicated by the foot prints, droppings, scratch marks on trees and a few remains of the kills made by the predators. The sightings of a number of forest birds only added to the experience. We actually didn't realize that we had been walking with the sun baking the earth at 43° centigrade. We were also constantly studying the bird diversity and density during our treks and Sitabani forest could easily be amongst the top contenders for



Elongated Indian tortoise

the best birding areas. And we were not even in winters, when the population shoots up with the Himalayan birds migrating to the lower altitudes.

People here have realised that a good forest is a good source of water

One particular incident during this trek however left us all very disturbed. As we criss-crossed the Khichadi River, often we were fascinated by the large number of fish and crabs that were seen. But just after noon, we were surprised to see a number of fish swimming fast and very close to the surface and sometimes even jumping off to the shore. What seemed to be an attempted suicide proved to be a case of fish poisoning in the river. The tribals all over the country are known to use the barks of trees to stun the fish in the pools and ponds and collect them for their consumption. But this was a case of massacre of thousands of fish in varying sizes from just a centimeter to over a foot in length. It had now become apparent to be a case of some chemical poisoning. The picture was even more disturbing as many of the fish seemed gravid and would have come upstream for spawning coinciding with the approach of the Indian monsoons. We came across a few people collecting bags full of fish in one of the pools. But when questioned, claimed that some one else had collected the booty and escaped. With lack of evidence against them, we could not even report them to the forest department.



That evening we heard a distant roar of a tiger calling out. Both the males and females use their roar signals, that can carry over 4-5 kms in the jungles. Females in estrus and the males who have located the scent message and are searching for them are able to communicate easily. Once located, the pair mates frequently till the time female remains in estrus. And during the whole period while she is in estrus, the male does not leave her company. Cubs are born after a gestation period of about 103 – 110 days. One would think that life would be easy for the tigers, being at the apex of the food chain. But the young cubs are always at risk from a very large number of predators like the leopard, hyena, jackal, and even a rival male, who would want to kill the cubs and thus force the tigress into a fresh estrus and then father her new cubs.

Interestingly, though it is widely believed that the male tiger has no role post-mating, many a naturalists have observed the male sharing a meal with the female and her cubs. Whether there is any role that he plays in their upbringing is a question that really needs to be studied. While a lot has been done to photograph the different moods of this magnificent predator, very little of its ecology is still understood. Most of our tiger knowledge was based on the reports of the Shikaris of the Raj days and a few conservationists and interested officers who doubled up as naturalists. Fortunately it was the efforts of the likes of Kailash Sankhla, George Schaller, Ulhas Karanth, Raghu Chandawat and a few others that fresh scientific re-look into the tiger ecology was taken up.

We returned from Sitabani forest after a brief stopover at Jim Corbett's erstwhile home and then took a heritage walk through the Choti Haldwani village where many anecdotes from his books come back to life. The wall around the village that helped prevent animals from raiding the crops still evokes memories of the generous support from Corbett when he was serving in the Railways, or the many families he supported during their rainy days and all the local lifelong friends he made – so unlike most of the other gora sahibs.

Than night the leopard went about on her business as usual. But with our camera trap still not functioning, we could only photograph the pugmarks. In the meantime it was decided to explore the Bhadragadi valley again in search of the siblings. Trishant, Naveen and I planned to visit the valley early next morning. At the last moment Anish, who was showing keen interest in the field replaced me and the trio left the campsite at 0420 hrs, even as the eastern sky started to light up. When they reached the entrance of the valley, they noticed an old set of pugmarks leading into the valley. Soon they were in an area of thick undergrowth of lantana adjoining the river. Lot is spoken about intuitions and sixth sense, though there is no scientific backing to all these para-psychological phenomenons. But today it happened again and the trio reached just a few meters away from the tiger siblings, who growled and announced their presence from inside the lantana cover.

Not wanting to disturb the siblings any further, the super excited trio continued their walk into the valley along the riverside to study further signs. They came across a whole set of fresh pugmarks of both siblings indicating that they were actually coming down from the Vandevi temple side and had probably entered the lantana bush just ahead of the crossing with the human trio. Soon the trio was at the spot where we had earlier stopped to watch the cackling Himalayan laughing thrushes, whistling thrushes, spangled drongos, and crimson sunbirds. But then today was a very special day and there was still time for the birds to start their activities. So today was the turn of the yellow throated marten to show up – and just ahead of them... cick, click,click... The beautiful predatory mammal made its entry into the large digital data that had been compiled over the last six days here. And this was just the tip of the ice berg of the rich bio-diversity of this location.

Many of our other sightings and experiences could not find place here but have been deeply etched in our memories and will last for a long time to come. Such training programmes for the Pugmarks Volunteers have been giving avenues for the youngsters who have found their hearts' callings in WCS, Biodiversity, Wildlife Biology and Environmental sciences in Indian and foreign universities. It has also been able to provide small insights into the new scientific studies that are replacing the Shikari tales.



The Entire Group!

From top left to right- Puran, Prakash, Arundhati, Mayur, Sahana, Kirpal, Lallu, Nikunj, Amit, Kamal, Sameer, Ritu, Jeevan

Middle left to right- Shraddha, Hansa, Anish, Manas and Pankaj

Bottom right to left- Shekhar, Anirudh, Naveen, Trishant, Amita, Jeevan and Eeshan