Feeding ecology of Gyps species of vultures in captivity

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Abstract

The entire study was carried out by observing the birds (White-backed, Long-billed and Slender-billed Vulture) in the three Colony aviaries (CA) (100x40x20 ft) through the CCTV (Close Circuit Television Camera) monitors. During the study attempt was made to determine the feeding hierarchy among vultures, food consumption by individual vultures and time taken for it. In the CA-2 birds (WBV) start feeding almost as soon as the food was provided (within 15 minutes) and they fed throughout the day. In CA-3(SBV) birds came on an average 23.16 hrs after food was provided but majority of them finished within an hrs. In CA-1 (LBV) birds also took more than 24 hrs to starts feeding after the food was provided. A vulture is fed 3 kilos of goat meat in a week which is equivalent to consuming 5% of its body weight per day. WBV with nestlings of different age groups were observed for studying the role of sexes in feeding the nestlings. On an average, the parents fed the nestling for 6.4 times, when nestling was less than 30 days. Male however feed the nestling during mornings and female during evenings. The feeding frequency decreased with the growth of the nestling.

Key words: Colony Aviary, Vulture, CCTV, Feeding ecology

Introduction

Captive populations can serve several conservation and education goals. In terms of conservation, they can be held as a genetic reservoir against loss of genetic diversity in the wild, to establish new wild populations or augment existing populations, or used to provide animals for research to promote conservation of wild populations. There are number of species in the world which owe their continuous existence to conservation breeding programme namely Californian Condor in U. S. and Mauritian Kestrel in Africa. The Vulture Conservation Breeding Programme is the first conservation breeding programme for any avian species in India.

Nine species are recorded from the Indian Sub-continent; of them five species belong to the genus *Gyps* while the others are monotypic. The population of White-backed Vulture has crashed by over 99.9% and of Long-billed Vulture and Slender-billed Vulture by over 97% (Prakash *et al*. 2007). The veterinary use of the non-steroidal anti-inflammatory drug diclofenac is the major cause of this catastrophic decline.

Studies on dietary habits are critical not only to determine a species nutritional requirement, but also to understand how distribution of food resources could determine density, local distribution, and social interactions (Oates, 1987). Studies of dietary habit and preference of food in captivity not only contributes to our understanding of their behavioral ecology but also have significant conservation and management implications. Data on the food and feeding habits of raptors in India has been mainly quantitative accounts based on Baker (1928), Grubh (1974), Ali and Ripley (1983), Prakash (1989).

Grubh (1974) studied the feeding habit of the White-backed, Long-billed Vultures and Eurasian Griffon by observing free ranging birds as well as birds in captivity and described that in nature vulture visits to the carcasses are controlled by three major factors: visibility, take-off space and safety.

Study Area

The present study was carried out from January to April, 2009 at the Vulture Conservation Breeding Centre (VCBC), Pinjore, Haryana. The study period covered mostly winter season. This is the World's first centre where three critically endangered *Gyps* species of vultures are kept in captivity. The birds of different age groups have been housed in different aviaries viz. Hospital aviary, Quarantine aviary, Nursery aviary, Holding aviary, Display aviary and Colony aviary. The centre has a well-equipped laboratory and hospital for health monitoring and veterinary care of birds.

The entire study was carried out by observing the birds in the three Colony aviaries through the CCTV (Close Circuit Television Camera) monitors.

In the absence of any one of the factors described above, *viz,* visibility, take-off space and safety; vultures do not visit a carcass.

Feeding habits of Indian Vultures

Vultures are scavengers and feed on dead animals. All nine species found in India have different mode of feeding. The feeding habit of an animal is also related to its body morphology and physiology. Vultures are scavengers and can digest almost all parts of the carcass, as their stomach content is highly acidic. The Egyptian Vulture have thin bill and light skull. They are suited to picking up tendons and ligaments. Infrequently,they are known to feed upon carcasses of human babies in Egypt (Kennedy 1874), and ostrich egg, by throwing stones at them to break open the shell (Goodall 1970).

They also consume carnivores' scats and maggots from buffalo dung (Prakash *pers. comm*). Red-headed Vulture and Cinereous Vulture largely prefers tough muscles. The Red-headed or King Vulture has powerful bill which enables it to feed on the skin and tough parts and open the carcass to make it easier for the other vultures (Prakash *pers. comm***)**. Lammergeier prefers bones. It feeds on bones and bone marrow by dropping bones on rocks to break them open (Newton 1979). All Gyps species of vultures are large

with heavy bills and long neck. They are anatomically suited to thrusting their long necks into bodies and tearing off soft flesh especially visceral organs (Kruuk 1967).

The study of the preference of food habit in all the vultures clearly reflects the 'ecological isolation'. The ecological isolation minimizes the competition for the food (Prakash 1989). Thus, they can feed together at the same carcass. There is a record in Keoladeo National Park, in which 7 species fed together at the same carcass. In raptors, ecological isolation among the coexisting species in hawks (Storer 1966**;** Van Bausekom 1972**;** Cody 1974 and Opdam *et al.* 1980) and in vultures (Kruuk 1967; Houston 1985; Koening 1976; Stewart 1978) has been studied. Martin (1988) hypothesis that the availability of safe nesting site may limit species co-existence. However, detail investigations on these mechanisms of 'coexistence' in raptors were undertaken in vultures (Grubh 1974) and *Aquila spp*. (Prakash 1989).

The feeding schedule followed at the Centre

The vultures are fed twice in a week (mostly on Wednesdays and Saturdays) during the non-breeding season and they are fed every day during breeding season. The vultures are fed at the rate of approximately 5% of body weight per day. The food is offered during early mornings or before it gets too hot to avoid all possible extra stress to the birds while the food is being placed inside the aviaries. Goats for slaughter are maintained at a farm for a minimum of 7 days to make sure they do not have Diclofenac residues in them. Diclofenac is excreted out of the body within 72 hour of administration. Diclofenac, a non-steroidal anti-inflammatory drug that is very toxic to vultures, is administered to cattle for relief in pain and inflammation. Everything except the skin is given for consumption. The food is weighed before it is given to the vultures through the food hatch.

Methodology

The study was carried out between January 09 and March 09 in all three colony aviaries at the centre. Feeding sequences were observed in one aviary in a day and all activities were recorded during feeding. Focal animals (Altmann 1974) were also observed for studying individual feeding behaviour. The bird was watched continuously during the entire process of feeding or till the bird disappeared. Number of birds feeding on the carcass was recorded every five minutes.

Results

Colony Aviary no.-1:

This colony aviary has 34 Long-billed Vultures. Average time taken for feeding after providing meat was recorded as 10 hrs (n=6) (Table-1). Average time taken for finishing the food was found to be 2.16 hrs (n=6) (Table-1). Maximum 33 birds were recorded at a time at the carcasses. During the study it was observed that the goats were thrown inside tail first (n=5) and accordingly vultures would also start eating from the hind side of the goat. Feeding begins with few birds and gradually the number increased (Fig-1). The peek feeding activity was noticed within 10 minutes after the vultures started feeding till about 80 minutes when the highest number of birds was observed feeding on the carcass(n=6). Within this time the birds would finish 90% parts of the carcass (n=5).

Colony Aviary no.-2:

This colony aviary has 34 White-backed Vultures. Average time taken for feeding after providing meat was recorded as 15.29 minutes (n=7) (Table-1). Average time taken for finishing the food was found to be 6.35 hrs (n=7) (Table-1). Maximum 27 birds were recorded at a time at the carcass. During the study it was observed that they feed on the carcass throughout the day (Fig-3). In the present study an attempt was made to study the feeding pattern of the juvenile bird. A day was spent on studying the feeding pattern of a juvenile bird which was born in the captivity. It was observed that it came throughout the day to the carcass. Juveniles were not dominant and they had to wait for the right opportunity to feed on the carcass. They were not efficient to feed on the harder parts of the carcass and would not get frequent opportunity to feed internal organs. So, that could be the reason that they were spending more time on foraging. During the study it was observed that the goats were thrown in side tail first (n=6) and birds would also eat from the hind limb first.

Colony Aviary no.-3:

This colony aviary has both the White-backed and the Slender-billed Vultures. It was found that Slender-billed Vultures were more dominant. They attacked first and majority of birds finished within an hour. Maximum birds were recorded on the carcass about 10 minutes after the birds started feeding and till about 60 minutes (Fig-2). Average time taken for feeding after providing the meat was found to be 23.16 hrs (n=3) (Table-1). Average time taken for finishing the food was found to be 1.76 hrs (n=3) (Table-1). All Slender-billed Vultures were recorded at a same time at the carcass. On the other hand, out of 15, 13 White-backed Vultures were recorded at a same time at the carcass. Few birds would come back in the next morning and would feed till about 9:00am.

Feeding the nestlings

Three nests were studied to find out the feeding frequency, amount of food offered and role of sexes in feeding the nestlings. For my reference, I have numbered the nests as N1, N17 and N28. All the three nests had nestlings of different ages. Both the sexes regurgitate food and the nestlings picked it from the parent's bill. In all the three nests it was observed that both the sexes fed the nestlings alternatively after they have fed. The nestlings were found to be voracious feeders.

In the colony aviaries, food was given between 9:00 to 11:00 hours when most of the birds fed. Parents of N1 and N17 fed several times during the day. Parents of N28 fed largely during the evenings.

Feeding the nestling depended upon the parents' feeding. In case of N1 and N17, the nestling was fed alternatively by both the parents after they had fed. The rest of the time i.e. before food is given in the aviaries, male took the major responsibility of feeding the nestling and in the evening; female took the major responsibility of feeding the nestling.

In case of N28, parents mostly fed in the evenings and so they fed the nestling alternatively thereafter and the rest of the time i.e. before the parents fed themselves, female took the major responsibility of feeding the nestling.

The parents stored food in their crop, which enabled them to feed, even if they had not fed themselves. Sometimes parents brought small pieces of bones to the nest, but swallowing them was not observed.

Nest no.1: The study was conducted when the nestling was between 12 to 40 days old. Both the sexes participated in feeding the nestling. During the study it was found that the nestling was largely fed by the male in the mornings and by the female in the evenings (Fig-4). In the middle hours of the day, after both the sexes have fed themselves, they fed the nestling alternatively. Frequency of feeding increased in the middle of the day. Average frequency of feeding per day was recorded to be 6.4 times by both the sexes during this period (Table-2). However, no significant difference was observed in feeding frequency in different age of the nestling.

Nest no.28: The nestling was 2 months old when the observations started. The nest was located in the colony aviary no.-3. During the study it was observed that unlike the parents of the other two nests located in colony aviary II, which fed the nestling several times during the day, these parents fed mainly in the evenings and then they fed the nestling alternatively (Fig-5). Thereafter, during the early hours of the day the female mainly fed the nestling.

Nest no.17: The nestling was 2.5 months old when the observation was initiated. It was observed that early in the morning male predominantly fed the nestling and after that both sexes would feed the nestling alternatively (Fig-6). Average feed per day was recorded to be 9.5 times by both the parents (Table-2). Frequency of the feeding increased during the mid day. No difference was found in the frequency of feeding in different age of the nestling.

Discussion

The vultures were fed on the entire skinned goat carcasses. Any living being requires food equivalent to 5% of its body weight per day. The meat provided to individual vultures was 4 kg per week and it amounted to more than 5% of their body weight per day. The vultures are scavengers and do not feed every day, so the food was provided twice a week.

The White-backed Vultures, which are smallest of Gyps vultures kept at the centre. They have comparatively shorter necks than the other Gyps vultures. These vultures would come to food almost immediately as it was offered. Most of the vultures in the aviary will come to feed shortly after the food was offered but same incubating birds will stay on the nests till their partner replaced them. The feeding on the carcasses continued throughout the day. The lone juvenile in the aviary would forage throughout the day. It was usually displaced by other birds. There did not appear to be any hierarchy while feeding. The feeding vultures will give way to the vultures that join for feeding. The juvenile appeared to be timid and was displaced by other vultures.

These vultures appeared to prefer feeding on fresh meat and they usually finished the major chunk of food the same day. This however, was in contrast with Long-billed vulture and Slender-billed vulture. The Long-billed will usually not forage in the day they are offered food but do so the next day. The Slender-billed would start feeding still later. It is possible that Long-billed and Slender-billed prefer putrefied meat. Both these species have comparatively longer necks than the White-backed vulture and could probe into the carcasses of large animals deeper. It is possible that it is easier to pull out putrefied meat from the animal carcasses and possibly easier to digest. The only danger in putrefied meat is the toxin released by anaerobic bacteria. It is possible that the vultures with their highly acidic digestive system are able to digest the toxin. This will however require further studies. Exploitation of the same food resource at different times may explain ecological isolation in the species and can explain the co-existence of similar species.

The Long-billed Vulture although take time to start feeding but finish up eating in just over an hour. They were also noticed to be feeding more during the evenings. Similar was the case with Slender-billed.

The Slender-billed and almost equal number of White-backed Vultures were kept in one aviary. The birds would take almost 24 hours to start feeding. It appears that Slender-billed who are bigger in size than White-backed were influencing the time of feeding. Both the species will however feed together. The Slender-billed Vulture did appear dominant at the feeding but the White-backed Vultures would feed side by side. It is not clear why the White-backed in company of Slender-billed take time to start feeding but in a separate Colony aviary where only White-backed are kept, they start feeding immediately. The amount of food offered to vultures appeared to be enough for the vultures. All vultures were found to have the crops full after the feeding bouts. It is essential to put extra food for the timid and handicapped birds that were seen feeding mostly after other vultures had left.

Summary

1. The White-backed Vultures start feeding almost as soon as the food is offered, whereas the other species start feeding almost after a day.

2. No clear hierarchy was noticed among the feeding birds. However in all the colonies a few individuals would start feeding first.

3. Adequate amount of food is offered to vultures as after feeding bouts, all the vultures have their crops full.

Table: 1

Time spent in feeding on carcasses in different aviaries

Colony aviary no.	Avg. Time taken to start feeding after the food provided	Avg. Time taken for finishing the food
1	10 hrs (n=6)	2.16 hrs (n=6)
2	15.29 min (n=7)	6.35 hrs (n=7)
3	23.16 hrs (n=3)	1.76 hrs (n=3)

Table: 2

Feeding the nestling by both the sexes of white-backed vulture

Nest No	No. of observations	No. of feed the nestling		Total	Average/Day
		Male	Female		
N1	5	17	15	32	6.4
N28	3	3	6	9	3
N17	4	18	20	38	9.5

Table: 3

Time spent by sexes in feeding the nestling per day

Nest No.	No. of Observations	Species	Feeding to nestling by				Total (min)	Average /Day (min)
			Male (Min)	Avg. (Min)	Female (Min)	Avg. (Min)		
N1	5	WBV	178	35.6	110	22	288	57.6
N28	3	WBV	14	4.67	25	8.34	39	13
N17	4	WBV	106	26.5	114	28.5	220	55

Fig-F1 : Number of Vultures on The Carcasses In Colony Aviary-1 with respect to the Time Lapse after Vultures Started Feeding

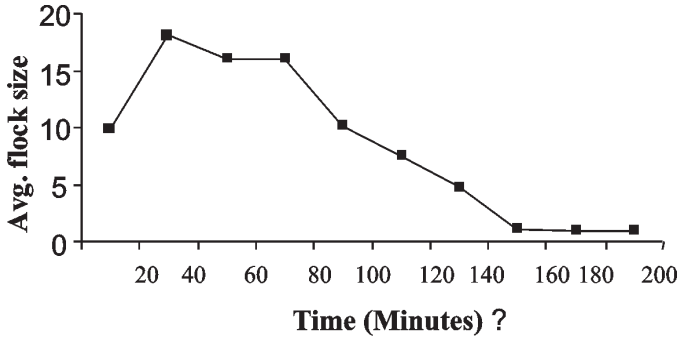


Fig-f2: Number of Vultures on The Carcasses In Colony Aviary-3 With Respect To The Time Lapse After Vultures Started Feeding

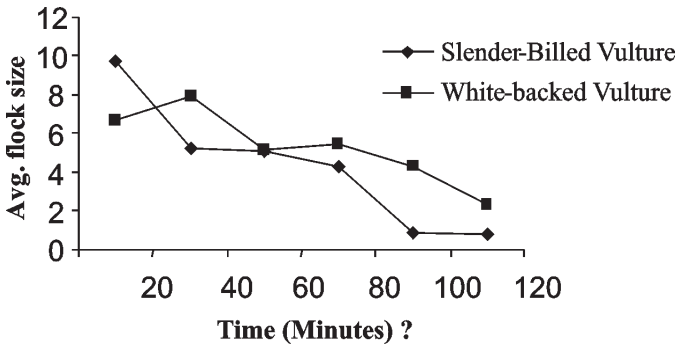


Fig - F3 : Number of Vultures on The Carcasses in Colony Aviary-2 with respect to the Time Lapse after Vulture Started Feeding

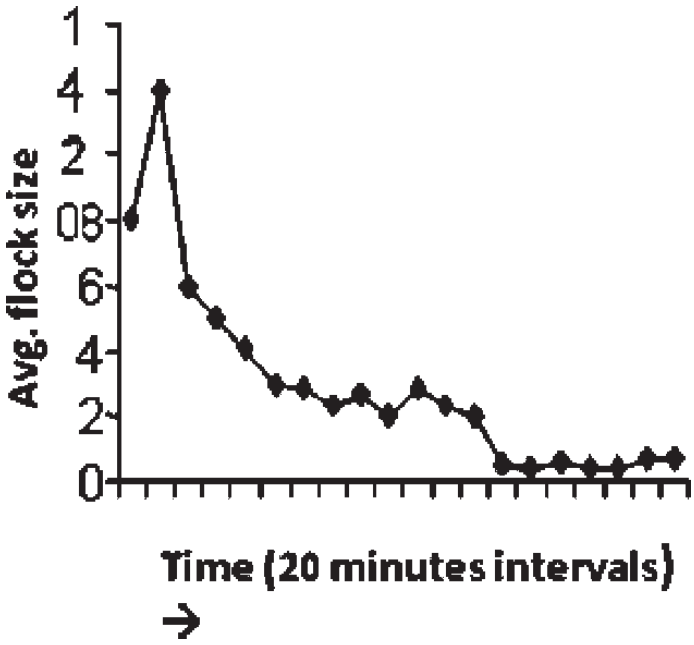


Fig-4 Temporal feeding pattern of the parents to the nestling in different daylight hours(N1, WBV)

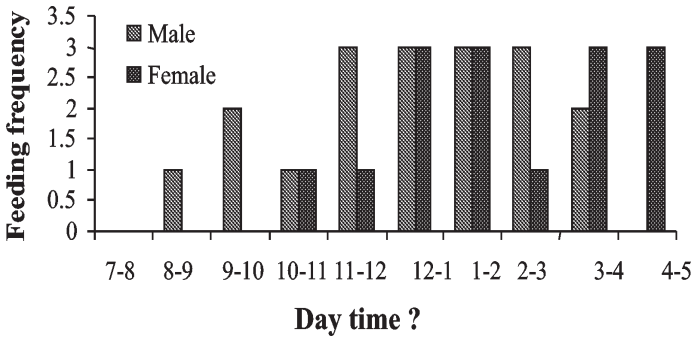


Fig-5 Temporal feeding pattern of the parents to the nestling in different day hours

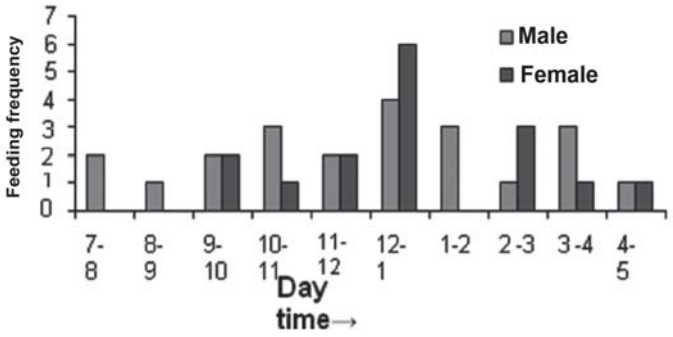
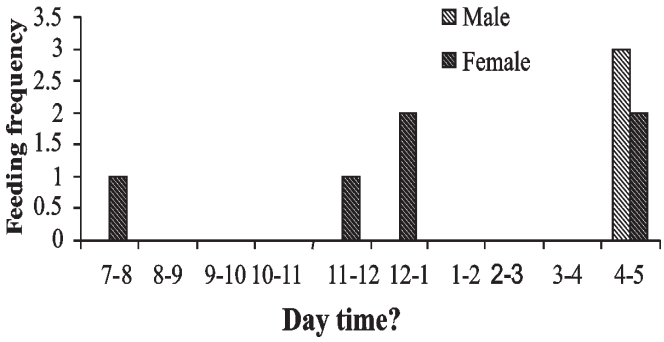


Fig-6 Temporal feeding pattern of the parents to the nestling in different day hours



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Breeding Records of Lesser Whistling Teal (*Dendrocygna javanica* Horsfield) in Kerala, India

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Lesser whistling teal *Dendrocygna javanica* is a common resident teal, distributed throughout the Indian subcontinent (Nepal, Pakistan, Sri Lanka, Bangladesh) and East and south east Asia up to west Indonesia (Kumar *et al.,* 2005). It usually prefers still freshwater lakes with plentiful vegetation, where this duck feeds mostly on water plants, nibbling on their seeds and shoots, and snack on insects and aquatic invertebrates (Bolen, 1976).

The geographical range of the species is varies from 1 to 10 million sq km with an estimated global population size of two to twenty million individuals (Wikipedia, 2010). Hence, the BirdLife International (2003) has categorized the teal as least concern and suggested that the species is not at the verge of extinction or endangerment.

Although the species is having a wide range of distribution, the variation in the regional breeding seasonality, clutch size and breeding site related characteristics are less explored. With the background, both primary and secondary data were collected to update the already known breeding seasonality, clutch size and nest site related characteristics of the teal in the State of Kerala, which is one of the important breeding ground for the teal in southern India. Most of primary data were collected as part of the survey on the wetland birds of Northern Kerala and in an intensive study site, Kadalundy Bird Sanctuary of Malapuram District. On every breeding record, the details such as nest site, clutch size, and number of fledgling if hatched were also recorded. Secondary data were collected by interacting with the local bird watchers and naturalists. Lesser whistling teal had frequently placed their nest near the freshwater with dense vegetation, which enables the chicks to reach the water immediately after hatching and enhance the nest concealing and protection from the potential predators.

Besides these, it also builds a shallow cup of grass, on or close to the ground. Altogether fourteen breeding records (authors reported five) were compiled from six respondents across the State (though it is not complete). The details of breeding seasonality, clutch size and place were given in the table. The known clutch size of the species was ranged between 7 and 17 eggs (Aldrich, 1945; Ali and Ripley, 1983), however, in an incidental observation (Rajan, 2007) around 21 eggs were recorded at Manasheri of Calicut District. This behavior of the bird indicates that the species is appearing to be a proliferate-breeder. But, the observations on the number of fledgling were ranged between 2 and 5 and this indicates that the species may undergo population decline due to severe predation as well as anthropogenic pressure during the hatchling and fledgling periods. The known breeding season of the species in India is from June to October (Parsons, 1940; Basu, 1968; Ali and Ripley, 1983) but the present study unveils that the species breeds before the onset of south west monsoon (i.e. before June) and extends up to November in Kerala.

Further, intensive studies on the breeding biology including seasonality, clutch size, nest sites related characteristics and anthropogenic pressure on the breeding success of the species in its distributional range will be required for the effective management of the lesser whistling teal and its associated environments.

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Table. Breeding records of Lesser Whistling Teal in Kerala

S. No	Date	Place	Habitat	Life history stage Clutch size/ No of fledglings		Observation
1	7.vi.2001	Calicut District, Vellalashery	Granite Quarry	Eggs	7	Rajan C.P.
2	5.vi.2007	Calicut District, Kadalundy	Paddy field	Chicks	3	Authors
3	12.vi.2007	Malappuram District, Velimukku Chali	Paddy field	Chicks	2	Authors
4	10.viii.2007	Kasaragode District, Angadimugar	Paddy field	Chicks	2	Authors
5	8.vii.2008	Kannur District, Chenkurichal wetland	Coconut palm	—	—	Rajivan P.C.
6	19.vii.2008	Waynad District, Payyampalli,Mananthavadi	——	Chicks	24	Vinayan.
7	21.vii.2008	Waynad District, Panamaram,	—	Chicks	2	Vinayan.
8	28.vii.2008	Waynad District, Padinjarathara,	—	Chicks	5	Vinayan
9	26.viii.2008	Kannur District, Chenkurichal wetland	Coconut Palm	nest		Rajivan
10	24.x.2008	Calicut District, Kadalundy	Paddy field	Chicks	4	Authors
11	09.xi-2008	Malappuram District, Velimuku Chali	Paddy field,	Chicks	4	Authors
12	25.vi.2009	Trichur District, Erinjalakkuda near railway station	On ground	Eggs	11	Rafi KS
13	27.vi.2009	Ernakulam District, Thripunithura, Railway station,	—	—	—	Vivek A
14	12.vii.2009	Palakkad District, Thrinellayi	—	Chicks	4	Subramanyan.B

Rescue and rehabilitation of an Indian Grey Hornbill (*Ocyceros birostris*) fledgling at Nagpur, Maharashtra

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On the evening of 28th June 2009 information was received that an Indian Grey Hornbill (*Ocyceros birostris*) fledgling was being attacked by a flock House Crows (*Corvus splendens*) and the fledgling was lying on the ground in Sakkardara locality of Nagpur city. People had gathered there to see the 'unusual' bird. Hence the parent Hornbills could not come down to rescue or defend the hapless fledgling. The fledgling was rescued and kept at residence of a nature enthusiast, Mr. Minitesh Tapre for the night.

On 29th June 2009, it was brought to the first author's residence. We found that the fledgling was slightly injured because of the attack by the House Crows. At the same time it was in a dazed and distressed condition.

On that day, we force-fed it with ripe berries of Neem (*Azadirachta indica*) (n=2), ripe Jamun berries (*Syzygium cumini*) (n=4) and ripe Umbar (*Ficus racemosa*) (n=1) fig. All these fruits were collected fresh from the trees nearby the researcher's house. We tried to force-feed it with a Garden Lizard (*Calotes versicolor*) but it did not swallow it for a long time. Hence it was discarded. The fledgling was kept in a separate room. It perched on a small stick which was brought and kept in the room between two supports. The fledgling roosted on the stick with neck retracted in the shoulders for the night.

The fledgling was again force-fed with Pipal figs (*Ficus religiosa*) (n=2) and *F. racemosa* figs (n=3). It was observed that the fledgling was regurgitating the large seeds of Neem (*Azadirachta indica*) and Jamun (*Syzygium cumini*) through the bill and not excreting it. Also it regurgitated the thin skin of the Neem berries through the bill. In the afternoon the fledgling became active and started taking small flights in the house. It flew away when we approached it for force-feeding. It hid itself behind the baggage in the house.

Also, if food was kept in front of the fledgling in a plate or even if the food was offered to the fledgling by hands, the fledgling did not consume it. Hence, the fledgling was again force-fed with one fig of Jamun and one fig of Umbar in the evening. This night the fledgling roosted in a tyre of a

motorcycle which was hanging in the gallery of the house. Probably, the tyre looked like a natural hanging branch forming a loop.

On 30th June 2009, the author along with Mr. Gopal Thosar (Honorary Wildlife Warden of Nagpur district) and Dr. Anil Pimpalapure (renowned birder of Nagpur) tried to locate the parents of this hornbill fledgling at the same place from where it was rescued. But no hornbills were sighted in the area. So the attempt of releasing the fledgling was given up for the day. The fledgling was given a diet of Curry Leaf (*Murraya koenigii*) berries (n=4), Banyan figs (*Ficus benghalensis*) (n=2) and Jamun berries (n=4).

On 1st July 2009, we started locating the hornbills in the area from 0530 hours at the same place from where the fledgling was rescued. At 0545 hours an adult Hornbill was located on a Pipal tree. Immediately the fledgling was released on a small Banyan tree (near the Pipal tree) studded with ripe figs, hoping that adult Hornbills will locate the lost fledgling again. The fledgling flew and hopped clumsily among the branches of the Banyan tree. It settled in a leafy branch. It called every few minutes.

The first author waited at the spot till 0730 hours . However, we informed some of our birder friends to keep a watch on the released fledgling on the tree. At 1400 hours, Mr. Tarun Balpande, an enthusiastic birder, merrily informed us that two adult Hornbills were feeding the fledgling on the same tree.

Then we along with Mr. Gopal Thosar, Dr. Anil Pimpalapure and Aditya Joshi, enthusiastic birders, joined Tarun at the spot at 1700 hours. The fledgling was still perched in the same tree. At 1715 hours a male Hornbill arrived and fed seven figs of Pipal (*Ficus religiosa*) to the fledgling. The male flew back to the nearby Pipal tree. It came back to the fledgling and fed it with one fig each of Pipal and Banyan within next few minutes.

At 1727 hours the male flew to the nearby Pipal tree and the fledgling also took a strong flight to the tree. Here the male continued feeding the fledgling. Both hopped in the tree.

At 1730 hours a House Crow attacked the Hornbill fledgling. The fledgling fell off from the perch and flew clumsily to a nearby small tree branch. The male Hornbill aggressively guarded the fledgling and escorted it to a dense tree. It agitatedly flew to the fledgling and to an electric wire. The male hornbill called “keeeya” many times (presumably to summon the female). Some Common Mynas mobbed the male hornbill but it did not pay much attention to them. At 1735 hours both the hornbills flew back to the Pipal tree. Then both the hornbills hopped among the branches of the tree till 1745 hours when the observations were stopped.

Acknowledgements:

We sincerely thank M/s Minitesh Tapre, Koustubh Thomre, Tarun Balpande, Aditya Joshi, Gopal Thosar and Dr. Anil Pimplapure for their help in the rehabilitation of the Hornbill fledgling.

Recent Sightings of Indian White-backed Vulture (*Gyps bengalensis)*

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The Indian White-backed Vulture, which has reached acute endangered status, was recently sighted at the following locations.

Balaghat Distt, Madhya Pradesh.

on 18th Oct 2009 , at 14.30 hrs on our way to Kanha National park , a solitary Indian White-backed Vulture (*Gyps bengalensis*) was sighted between villages Dongaria – Kaniya on Gandai -Malajkhand road, Distt – Balaghat , Madhya Pradesh. The solitary bird was soaring and circling, about 200 mts to east of road, over fields and moving further towards hills about 2 kms away. We continually scanned the horizon but no other vulture could be sighted by us.

The co-ordinates of the location are N-21 83’057" , E -080 81’713" , MSL -264 mts , this location is about 50 kms south of Kanha National park ,where the species still exists though in meagre numbers.

Though the possibility of vultures wandering from Kanha National Park, to the region can not be ruled out, the hilly tracts around Kaniya and Dongaria need to be explored for the occurrence of an isolated population of Indian White-backed Vultures.

Bilaspur, Chhattisgarh.

On our way to Bilaspur on 11th November 2009, eight kilometres ahead of the near new High Court building (N 22.02000^0, E- 082.10192^0, Altitude- 278 Mts) two vultures arrived from left , crossed road and flew eastwards. We scanned the sky and noticed yet another pair of vultures soaring and circling over the agricultural fields some 200 meters away. In all four vultures were noticed by us in this area. It is emphasised here that the species was found nesting about 15 Kms south of this area. About five years ago, we could watch the vultures on road side trees on a regular basis but thereafter they were never sighted here.

The nearest region, where the species still survives is Aonrapani area of Achanakmar Wildlife Sanctuary, Distt Bilaspur, about 200 Kms., further north. There is a remote possibility of vultures commuting from Achanakmar to this locality. The four vultures sighted by us are perhaps nesting and roosting somewhere nearby and there is also the possibility of a few more vultures occuring in this region.

All the same, the above sightings were not only encouraging but also indicative of the fact that this species is possibly recovering and re-establishing in the region.

How do the Vultures communicate?

A.M.K.Bharos, B-101, Gayatrinagar, RAIPUR. CG. 492007.

Of late, I have been thinking how do the vultures see and locate the carcass, miles away and reach there in congregation to feed.

There are thousands of instances when a carcass has been left after skinning and vultures arriving to feed within a short time. Of course the omnipresent kites and crows are the first to reach the spot, but soon the vultures follow the suit.

When the vultures were plentiful they could be seen converging from all directions. Even when a few of them start feeding, others continued to arrive.

The species is known to soar high in the sky and from such a height how they manage see and locate the food is really amazing.

Ofcourse, it is understandable that they observe the movements of the predators such as the Wild dogs and proceed to get their share; if at all if anything is left out. This was observed by me at Kanha National Park three years ago.

Once the food is located by any of the vultures, others soon follow and assemble. Do these birds possess extreme sighting powers of locating the food lying on the ground or do they smell, as birds have not been known to have the sense of smelling.

Then the only possibility remains is that when any of them locates a carcass, it somehow communicates to others, or simply by the mode, follow me, about it and the congregation moves.

Or do they observe the movement of crows and kites or get attracted by their calls and follow them towards the food.

In the case of elephants, they are said to communicate long distances in low frequency messages, but are the vultures equipped with some communication device or it is simply the natural instinct that forces them to do so. Are there any literatures on this subject? I solicit comments and views on the subject matter.

CORRESPONDENCE

BILL DEFORMITY IN BLUE ROCK PIGEON (Columba livia), IN THANE, MAHARASHTRA, *by RAJU KASAMBE, Bombay Natural History Society, Shaheed Bhagat Singh Road, Mumbai-400001. Maharashtra, Email: kasambe.raju@gmail.com*

On 7th June 2010, I saw a Blue Rock Pigeon (*Columba livia*) with a hooked bill. The bill of this particular pigeon looked like the one of a Shikra (*Accipiter badius*) or some raptor. The upper mandible of this pigeon was quite elongated. But the lower mandible was normal. There was no difference in the behavior of this pigeon or of other pigeons towards it.

I saw and photographed this pigeon from my 7th floor apartment in Thane in Maharashtra, as it perched in the window of the nearby apartment.

Blue Rock Pigeons are abundant in Mumbai and Thane and breed in tall buildings and apartments. They are fed usually by people in parks, playgrounds, and tourist spots.

Bill deformities have been reported in Indian corvids like the House Crow *Corvus splendens*, the Large-billed or Jungle Crow *Corvus macrorhynchos* and the Yellow-billed Blue Magpie *Urocissa flavirostris* (Kasambe et. al., 2009). I think that birdwatchers need to look at all the common species of birds for deformities.

Reference:

Kasambe, R., Joshi, A., and Meppayur, S. (2009): Bill deformities in House Crows *Corvus splendens*, Large-billed Crow *Corvus macrorhynchos* and Yellow-billed Blue Magpie *Urocissa flavirostris* in India. *Newsletter for Birdwatchers*. 49(5): 73-78.

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SIGHTING RECORD OF THE GREATER ADJUTANT (Leptoptilos dubius) In Kanha National Park, India, *by AJEET BHAROS, B-16, Sriramnagar, Raipur, CG. 492007.*

The distribution range of the Greater Adjutant *(Leptoptilos dubius)* has been mentioned as resident, nomadic and locally migratory, and recorded from South Pakistan to Assam and south to Karnataka, India. Grimmett and Inskips consider the Greater Adjutant as a globally threatened species and they have indicated a very restricted range in Central India in their distribution map of the species.

On my way back to Raipur from Kanha NP, at Chilparha tank in Supkhar area of the Kanha National Park, around 0800 hrs on 4 May 2008, I sighted a bird on the edge of a waterbody. It was stationary and kept still for quite some time during the 5 minutes observation period. Its size, plumage and the prominent neck pouch, matched with those in illustrations, hence there was no doubt about its identification.

As per the records the species is very rare and seen sporadically in this region, where as the Lesser Adjutant (*Leptoptilos javanicus*) is fairly common inside the National park. Therefore the sighting of this rare species is worth a mention and needs to be highlighted.

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FIRST RECORD OF GREY-HEADED LAPWING (Vanellus cinereus) FROM KONKAN *by SACHIN BALKRISHNA PALKAR, Member of the Sahyadri Nisarg Mitra, Chiplun. Near D.B.J.College, Sathybhama sadan, Mumbai-Goa Highway, House no.100, A/P-Chiplun, District – Ratnagiri. Pin code 415 605. Maharashtra, India. Email:-sachinbpalkar82@gmail.com.*

On 1st March 2010 during a bird watching trip, I found two adult Grey-headed Lapwings *(Vanellus cinereus*) at Kaluste-Bhile kharland area, about 8 kilometers from Chiplun (17°-31'N; 73°-31'E) city.

This is the first record of this bird in Konkan as there are no previous records. This bird is winter visitor (September to April) to W. Bengal, Assam , Manipur, and East Pakistan, Kathmandu Valley, Nepal, N.Bihar, Kashmir, Dehara Dun, Rajasthan, Andaman Islands.

Breeds in Mangolia, China south to the Yangtse Valley, Manchuria, Korea and Japan. Winters in S. China, E. India, Burma, Malaya and the Indochinese countries.

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AVIFAUNA OF BUXA TIGER RESERVE: A FIELD TRIP REPORT *by SHANTANU BHATTACHARYA, B-107, Survey Park, Santoshpur, Kolkata- 700 075, West Bengal. e-mail: shntn07@gmail.com*

In the first week of June 2010, I visited the Buxa Tiger Reserve which is situated in the northern side of West Bengal for bird watching. The forests of the Buxa Tiger Reserve provide home to a variety of birds and some of them are endangered.

Buxa Tiger Reserve (Area-760 Sq.Km 26 39' 0"N and 89 34' 48"E) is located in the Alipur Duar subdivision of the Jalpaiguri district of West Bengal. It shares its northern boundary with Bhutan. The Sinchula hill range runs all along the northern side of the reserve, and its eastern boundary touches Assam. National Highway No.31C runs along its southern boundary. The historic Buxa Fort lies inside the reserve at a height of about 2600 feet, and Mahakal temple also lies within the reserve.

The Manas Tiger Reserve lies to the east of BTR (Buxa Tiger Reserve). So the fauna of BTR is somewhat analogous to the Manas Tiger Reserve of Assam, and it represents the endemic fauna of the Indo-Malayan region. The Phipsu Wildlife Sanctuary of Bhutan is contiguous to the north of this reserve. Hence, BTR serves as an international corridor for the migrating elephants between India and Bhutan.

Conservation history of Buxa Tiger Reserve:

Buxa Tiger Reserve was established in 1983 which includes the entire forested area of Buxa Tiger Division, and also some territory of the adjoining Cooch Behar Forest Division. In 1986, the Buxa Wildlife Sanctuary was set up over 314.52 sq. kms of reserve forest. In 1991, about 54.47 sq. kms area was added to the sanctuary. In 1997, State Government declared about 117.10 sq.kms of the sanctuary as the Buxa National Park.

Flora: There are different kinds of vegetation in BTR. More than 350 species of trees, 200 species of shrubs, and 400 species of herbs, 10 species of bamboos, 100 species of grasses and 130 species of aquatic flora have been identified so far. Many species of orchids and ferns are also found here. The main species of trees are Sal *(Shorea robusta)*, Simul *(Bombax ceiba)*, Champ, Bahera *(Terminalia belerica)*, Chikrasi *(Chukrasia tabularis)*, Shegoon *(Tectona grandis)*.

Fauna: The fauna of Buxa Tiger Reserve represents the endemic Indo-Malayan Fauna. About 390 species of birds, 73 species of mammals, 76 species of reptiles and 8 species of amphibians have been identified.

Mammals: Tiger *(Panthera tigris)*, Asiatic Elephant *(Elephas maximus)*, Gaur *(Bos gaurus)*, Wild Boar *(Sus scrofa)*, Sambar deer *(Cervus unicolor)*, Barking deer *(Muntiacus muntjac)*, Cheetal deer *(Axis axis)*, Leopard (*Panthera pardus)*, Indian Porcupine *(Hystrix indica)*, Jungle cat *(Felis chaus)*,Malayan Giant Squirrel *(Ratufa indica)*, Large Indian Civet *(Viverra zibetha)* and Small Indian Civet *(Viverricula indica)* are found in BTR.

The reserve is also home to some rare species of mammals like the Leopard Cat *(Felis bengalensis)*, Chinese Pangolin (Manis sp.), Crab-eating Mongoose *(Herpestes urva)*, Marbled Cat *(Pardofelis marmorata)* Clouded Leopard *(Neofelis nebulosa)*, and Hispid Hare *(Caprolagus hispidus)*.

Birds (Avifauna): About 390 species of birds are found in BTR of which some like the Bengal Florican, Great Indian

Hornbill, Rufous-necked Hornbill, Wreathed Hornbill, and Sultan Tit are quite rare.

Reptiles: 76 species of reptiles including the Indian Cobra *(Naja naja)*, Water Monitor *(Varanus salvator),* Common Krait *(Bungarus caeruleus)* and Indian Rock Python *(Python molurus)* are found in BTR. Eight species of frogs and toads have been reported.

Systematic list of birds sighted in the Buxa Tiger Reserve:

1. **Common Peafowl** *(Pavo cristatus)*: This bird was quite common in the riverbeds and grasslands of BTR. Pairs were often seen in the Bala riverbed. They were also found foraging in the grassy riverbanks. However, they ran inside the forest or took to air whenever disturbed.

2. **Thick-billed Green Pigeon** *(Treron curvirostra)*: A flock of this species was spotted on 6th June in a tree at Jainti. The birds were busy feeding on the figs. A pair perched on a tree near the resort, and were seen swaying their tails up and down.

3. **Asian Fairy Bluebird** *(Irena puella)*: A pair was seen at Rajabhtakhawa Forests near the road that connects Jainti with Alipur Duar. The birds were seen calling loudly, and playing among the branches. A lone bird was also seen perched on the top branch of a bare tree beside Jainti River. This species was quite common in the forests, and was often spotted during the jungle safaris.

4. **Chestnut-tailed Starling** *(Sturnus malabaricus)*: Many birds were seen in and around Jainti. The fig trees attracted quite a few starlings.

5. **Spot-winged Starling** *(Saroglossa spiloptera)*: A huge flock of Spot-winged Starlings arrived at Jainti on 8th June, and was seen moving from tree to tree, feeding on berries and fruits in noisy rabbles. A few were preening their feathers. I spent considerable time observing them form a close range.

6. **Chestnut-bellied Nuthatch** *(Sitta castanea)*: This species was also common at Jainti. On 6th June a pair was seen scampering up and down the moss-covered trunk of a big Jackfruit tree near the resort, searching for insects.

On 7th June, a parent was seen to feed a juvenile individual with care. The parent brought food for the hungry juvenile. The juvenile opened its mouth wide, and the parent fed the hungry chick with insects and grubs. The juvenile was constantly squeaking like a mouse and spreading its wings, whenever the parent bird came to feed it.

7. **Black-crested Bulbul** *(Pycnonotus melanicterus)*: This bulbul is possibly the most abundant bulbul of Jainti-Buxa. They mostly searched for insects in the trees, and sometimes were seen perched on the telegraph wires. They were especially active in the afternoons. One was found catching winged termites on a forest trail.

8. **Scarlet Minivet** *(Pericrocotus flammeus)*: A flock of this species was spotted in the trees at Jainti several times. I also came across a large flock in the forests near the Bala river.

9. **Golden-fronted leafbird** *(Chloropsis aurifrons)*: This species was very common in the area, and was seen mainly near human habitations. They searched for berries and insects among the dense foliage, and flew from one tree to the other. This bird can be seen in abundance, and Buxa is a wonderful place to study their behaviour.

10. **Lesser Yellow-naped Woodpecker** *(Picus chlorolophus)*: One bird was observed on a tree near the Jainti river. It was tapping on the bark of a tall tree. Another bird was seen feeding on berries in human habitation. These birds made a lot of noise as they gathered fruits and berries from the trees.

11. **Red Jungle Fowl** *(Gallus gallus)*: This bird was seen in pairs on the jungle trail for three consecutive days. They were sometimes found scraping the soil with their feet, to find insects and grubs.

12. **Dollar bird** *(Eurystomus orientalis)*: A pair was spotted on a bare tree, while I was proceeding to Pukri pond. They were seen repeatedly taking off from the bare branch to catch air-borne insects, and sallying back to the perch with the prey.

13. **Green-billed Malkoha** *(Phaenicophaeus tristis)*: One bird was seen in the forest near Jainti river. It seemed to be a shy bird and flew away at the slightest disturbance. Another bird was spotted on the way to Bhutia basti, on the other side of Jainti river. It hid itself behind the dense leaves, and hopped from one branch to the next, like a squirrel. It was seen emitting a deep booming call.

14. **White-rumped Shama** *(Copsychus malabaricus)*: It was quite common in the area. One bird was seen singing loudly in the forests near the Forest Bunglow. The melodious call of this songster was heard frequently, and I was lucky to see this bird twice. Calls were heard mostly at dawn and dusk. The calls were more audible but the bird was rarely visible, because of its secretive nature.

15. **Greater Yellow-naped Woodpecker** *(Picus flavinucha)*: This bird was encountered in the Rajabhatkhawa forests of BTR. It was pounding the rotten bark with its chisel-like beak to expose and feed on grubs and termites.

16. **Oriental Pied Hornbill** *(Anthracoceros albirostris)*: One bird was seen high up in the canopy, on 8th June in the morning while returning from Santhalabari.

17. **Ruddy Kingfisher** *(Halcyon coromanda)*: This bird was spotted from the vehicle during the jungle safari. It took off from the ground and perched on a tree along the forest path. It seemed to be at home in the deep forest, far away from water source. It is probably fond of the insects and reptiles that it gets in the forest.

18. **River Lapwing** *(Vanellus duvaucelii)*: This bird kept a watch from the sandbanks and riverbed of the Jainti river, and it took to the air when I approached it. It started to circle around, calling loudly perhaps to divert my attention from its nest, which was well hidden somewhere among the pebbles.

19. **Lesser Necklaced Laughing Thrush** *(Garrulax monileger)*: A flock of this species was spotted in the moist broad leaved forest of Buxa. They suddenly came out of the bushes, hopped on to the branches of a tree and soon disappeared down a ravine.

20. **White-capped Water Redstart** *(Chaimarrornis leucocephalus)*: A single bird was seen near a stream in Buxa. It was found hopping on the stones, and catching tiny air-borne insects.

21. **Blue Whistling Thrush** *(Myophonus caeruleus)*: One bird was seen in the stream-bed on 7th June in the evening. I heard the melodious whistles of this bird on a number of times.

22. **Silver-eared Mesia** *(Leiothrix argentauris)*: A small flock of these birds were seen near Santhalabari, on the way to Buxa hills.The birds were flying among the dense bushes, feeding on nectar of flowers.

23. **Greater Racket-tailed Drongo** *(Dicrurus paradiseus)*: This bird was seen on different occasions. It mostly kept to the dense forest and shady places. One was also seen mobbing a Common Kestrel near the Bala river.

24. **Tree Sparrow** *(Passer montanus)*: This species was quite common at Jainti. It preferred to stay close to human, and found enough food in the human habitations.

25. **Jungle Owlet** *(Glaucidium radiatum)*: One individual was seen in the Buxa forest. It was perched on a low bushy tree, and bobbed its head from time to time.

26. **Hill Mynah** *(Gracula religiosa)*: Huge flocks were seen flying over the canopy. They perched in the upper branches, and called loudly. The calls consisted of whistles, ringing of bells and cackling.

27. **Crested Serpent Eagle** *(Spilornis cheela)*: One bird was spotted near the salt-lick inside the Buxa forest. It disappeared in the thick foliage within a few seconds, flapping its large wings.

28. **Grey-capped Pygmy Woodpecker** *(Dendrocopos canicapillus)*:

It was common in the wooded parts of Jainti. This bird was seen pecking the bark in search of insects and emitting loud “Peek-peek” calls.

29. **Large Woodshrike** *(Tephrodornis gularis)*: This bird was seen once on a tree near the Bala river. It is a species seldom seen in Buxa, and keeps to mostly dense broad-leaved forest.

30. **Maroon Oriole** *(Oriolus traillii)*: A pair was spotted inside the Buxa Forest (Jainti range). They were flitting among the branches while giving loud whistle like calls. A juvenile was seen on 6th June in the evening near Bala river.

The broad-leaved and moist deciduous forests of the Buxa Tiger Reserve seemed to be a heaven for birds.

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Acknowledgements:

I am deeply indebted to Mr.Aroop Chaudhury,Vice President: India Trees Foundation, for preparing this report and for his continuous inspiration.

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ABODE OF PEACOCKS NEAR HIDKAL DAM, BELGUAM, THREATENED, by GURUPRASAD TIMMAPUR, A-75, Hidkal Town, Dist. Belgaum, Hukeri - 591 107, Karnataka.

There is a pristine scrub forest of about 9 square kilometer area in front of the Hidkal dam site, built across Malaprabaha River in Belguam District, Karnataka. The Hidkal dam area is under the control of the Irrigation Department, which has been fenced off and declared as a restricted area. The area is a unique scrub forest and has become a permanent abode of some 40 pairs of peafowl. Peacocks can be seen gracefully waking up and down the mini forest, displaying their long iridescent dazzling tail feathers proudly, even as the drab peahens scurry to their nests to resume the incubation. The area is also a home to numerous larks, partridges, orioles, drongos, as well as a couple of birds of prey.

But all these cheery bird activities are likely to come to end soon, as the authorities are planning to convert this forest area into a garden with fountains etc., similar to the Brindavan Gardens (in front of the KRS Dam near Mysore), to attract tourists in large numbers. This is the only protected area in the district, where the peafowl are nesting peacefully without even a slightest threat from humans. And for that reason, it has to be protected at all costs. I solemnly request the nature loving fraternity to take up the issue at the appropriate level to nip this myopic plan in its very bud and protect this unique abode of peacocks.

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Manuscript for publication should be sent (in duplicate) by post or courier to the above address along with a soft copy (in MS Word format only) via E-mail to <navbarat@gmail.com>

Sniffer Vulture 'Sherlock' can detect the scent of rotting flesh from 3,000 feet up. *Photo Courtesy AFP*

Grey-headed Lapwing (Vanellus cinereus) at Konkan, *photo by Sachin Balkrishna Palkar, (page 74)*

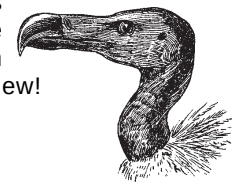
Note from the Publisher (Continued).

While we are on the subject, Police detectives in Germany have trained a turkey vulture named as 'Sherlock' – which could be the first of many to help with criminal investigations. Sleuths fancy exploiting Sherlock's amazing smelling sensors to single out corpses buried furtively in secluded areas. A GPS trailing gadget is fixed to Sherlock's leg and it flies fairly low to detect the gasses produced by the beginnings of the decaying corpses. The idea was mooted after watching a nature programme, according to Rainer Herrmann of the German Police Force. 'If it works, time could be saved when looking for dead bodies because the birds can cover a much larger area than sniffer dogs or humans' ; Hermann quipped in an interview to a journalist. Vultures like Sherlock have a keen sense of smell and are able to detect the scent of rotting flesh from 3,000 feet up in the air. Even the corpses hidden in woodland or in thick undergrowth are discovered accurately. This is indeed grave news for sniffer dogs which are trained to track down dead bodies. Because trained sniffer dogs would take considerable time and toil before accomplishing the strenuous task, notwithstanding the regular breaks and rests needed by the canine and its handler. But the vast, rugged terrain of northern Germany's Lueneburg Heath can be traversed by vultures like Sherlock effortlessly and he is being taught by trainer German Alonso to love the putrid smell of dead human flesh.

According to topical reports, Sherlock is being readied for his new mission at Walsrode south of Hamburg, the largest bird park in the world with 650 different species from all corners and every different habitat of the globe. Alonso claims that he is training Sherlock by placing pieces of meat in small cups, on a strip of cloth - provided by the police - that has been used to cover a corpse and Sherlock's mission is to locate these flavorsome morsels. Frequently Sherlock is persuaded to perform this feat as part of the Walsrode Park's daily shows to its visitors and he has not only developed an appetite for the job, but has also got a rough idea of the task assigned to him. Alonso also claims that Sherlock has become pretty popular in Germany, as his dexterity has been beamed in lots of television programmes and reported in newspapers.

But the much hyped project still has a long way to go and that it will not become a reality until there is a complete squadron of trained vultures with Sherlock in charge, set to take to wings as a squad. Basically, Alonso and other vulture trainers are finding it difficult to procure vultures, particularly tame, young ones. Turkey Vultures like Sherlock are rare in captivity and they have to be receptive and docile in order to be trained, and therefore they have to be raised from hatchlings.

Back in India at the Pinjore Vulture Conservation Breeding Centre, vultures are presently being bred and fed from their nestling stage. Some researchers may be wondering if these vultures could be trained for forensic duties, similar to that of Shrelock at Germany. But due to legal imitations, traditional beliefs and taboos coupled with the all time consuming drudgery involved in the training of vultures, it will be well neigh impossible even to dream of such a project in India. And for that reason the vultures at Pinjore, ought to be confined to their enclosures for the rest of their lives or until such a time we are able to restore the environment to its glorious past and bestow inhabitable conditions for the vultures to freely roam the breath and length of this country, anew!



Thanking you,

Yours in Bird Conservation
S. Sridhar, Publisher, NLBW

Cover Photographs

Avifauna of Buxa Tiger Reserve: A Field Trip Report (Pages 74-76)

1	**Purple Sunbird**	*(Nectarinia asiatica)*	(eclipse plumage)
2	**Thick-billed Green Pigeon**	*(Treron curvirostra)*	
3,4	**Spot-winged Starling**	*(Saroglossa spiloptera)*	
5	**Grey-capped Pygmy Woodpecker**	*(Dendrocopos canicapillus)*	
6	**Lesser Yellow-naped Woodpecker** ♂	*(Picus chlorolophus)*	
7	**Greater Yellow-naped Woodpecker** ♂	*(Picus flavinucha)*	
8	**White-capped Redstart** or **River Chat**	*(Chaimarrornis leucocephalus)*	
9	**Scarlet Minivet** ♂	*(Pericrocotus flammeus)*	
10	**Large Woodshrike**	*(Tephrodornis gularis)*	

All photographs by ***Shantanu Bhattacharya***


reserved for colour photographs

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Note from the Publisher

Dear fellow Birdwatchers

Smelling abilities of Vultures

We have published two articles on vultures *viz* 'Feeding ecology of Gyps species of vultures in captivity', by D Laher *et al*, and 'How do the vultures communicate?' by A.M.K. Bharos in this issue. Bharos wonders whether vultures have the ability to smell. As most of us are aware, the Gyps Vultures mainly feed on carrion, and they travel a lot in search of large carcasses. They locate carrion by spotting it directly from the sky or by following the movement of predators, other scavengers, such as ravens, dogs, and hyenas. However, Turkey Vulture is known to forage by smell; an exceptional faculty in the avian world. Turkey Vulture often flies low to the ground to pick up the scent of ethyl mercaptan, a gas produced by dead animals that begin to decay. When compared to other animals' brains, the olfactory lobe of this vulture is significantly large, and this helps in quick processing of smells and nose-diving to their banquets. Equipped with this virtuosity, the bird detects the odors emanating from the carrions lying under the forest canopy. Nevertheless, it took relatively long time to provide credible evidence to this. James Audubon was one of the foremost investigators, who suspected that the vultures were able to detect carrions by the putrid smell emitted by them. In order to test the vultures' smelling abilities, Audubon concealed extremely putrid meat as bait. But, when the vultures did not respond to this bait, investigators had concluded that vultures were unable to detect the smell. However, in reality, turkey vultures have acquired an overwhelming facility to detect carcass by smell; it's just that they prefer fresh meat to rotten. Subsequent experiments were conducted by a by a Panama researcher. He had placed chicken carcasses in the tropical forest, concealing them under the forest canopy. Vultures rarely discovered the baits on the first day, obviously since they were still too fresh to give off much putrid smell. But the vultures unearthed almost all the decaying chickens by the second day, as they started stinking progressively. While checking out for reeking stuff, turkey vultures fly relatively low so they can detect scents emanating from the ground. On the contrary, other vultures which lack the faculties to smell carrion, keep soaring in the sky, to keep an eye on the activities of turkey vultures flying far below. Atleast two other vultures are endowed with the sniffing apparatus similar to the Turkey Vulture; they are the Greater Yellow-headed Vultures and the Lesser Yellow-headed Vultures. On arrival at the carcass, the Turkey Vulture displaces the Yellow-headed Vulture due to its larger size, but is displaced in turn by the King Vulture, which is larger than the two vultures. The King vulture has the ability to make the first incision into the skin of the dead animal, which in turn allows the smaller, weaker-billed, Turkey Vulture access to the decaying meat, because it cannot tear the tough hides of larger animals on its own. This is yet an example of mutual dependence between species, which we have discussed in the recent past.

The bacteria that cause putrescence give off toxins, and although vultures do have heavy-duty stomachs compared to other animals, they prefer to avoid really revolting stuff and are known to favor fresher carcasses to more disintegrating ones.

A turkey vulture can smell decomposing gases from more than 200 feet in the air. A hole in their beak – running from side to side - permits air currents to enter from either direction. This notable element assists the turkey vulture to zero on a carcass with pinpoint accuracy. Its sense of stench is so precise that gas companies in Texas have been known to engage this scavenger to help find natural gas leaks! Dr. Frank B. Gill, a researcher, has described in detail as to how the turkey vultures have been used to find leaks in a 42-mile-long oil pipeline. It is now known that when ethyl mercaptan, which smells like rotting meat, was pumped through the pipeline, the birds gather swiftly at places wherever the gas was leaking.

Because natural gas has no odor, ethyl mercaptan, one of the gases released when flesh is decaying, is injected into the gas line. When the mingled gases leak out at a crack in the pipeline, the only detectable scent is ethyl mercaptan, which at once attracts the attention of patrolling turkey vultures, and they descend to the spot in a jiffy in anticipation of dinner. The repairmen, who keep a constant watch on the movements of the vultures, proceed to the spot to repair the pipeline.

....Continued on page 77

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