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Cover photo: *Prosotas bhutea* by K.C. Sajan.

Wildlife rehabilitation in Mizoram, northeastern, India

Wildlife rehabilitation is “the treatment and temporary care of injured, diseased and displaced indigenous animals and the subsequent release of healthy animals to appropriate habitats in the wild” (Miller 2012). The alteration of habitats due to anthropogenic activities have resulted in massive encroachment and habitat loss which has driven an inevitable increase in interaction between humans, wildlife and domestic animals (Schmeller et al. 2020). This increase in interactions at the human wildlife interface disinclines peaceful coexistence between the two, resulting in either perceived or real human-wildlife conflict situations. Wild animals also face high risk of extermination when they are displaced in human dominated areas while wandering in search of food and shelter (Singh 2015). Higher level of decline in wild animal populations has been found to be associated with high degree of human wildlife conflict (Woodroffe et al. 2005).

All these factors lead to situations where wild animals are in distress, displaced, injured or orphaned, thus, warranting rescue. Mizoram is a state in the Northeastern region of India and is situated among the Indo-Burman biodiversity hotspot. Not only is there a lack of awareness and paucity of information on the basic ecology and population of species in the area, wildlife populations here are severely threatened with hunting and habitat degradation (Lalthanzara et al. 2014). To add to these existing threats, infectious diseases transmissible between domestic

and wild animals have been a cause of worry for free ranging wildlife populations (Dutta et al. 2018). With all these considered, it is evident that wildlife rescue and rehabilitation is pertinent to conservation (Shine & Koenig 2001), especially in areas where wildlife is threatened with hunting and habitat destruction. However, although wildlife rehabilitation is practiced across the globe, it is still in its infancy in India (Holcomb 1995; Ashraf & Menon 2005; Roshnath & Jayaprasad 2017) and more so in certain parts of the country, by and large, in the northeastern region.

Here, we catalogue and evaluate a list of opportunistic rescues of wild animals that have been rehabilitated by the authors and the outcome of the treatment of animals brought into care. Considering the threats wild populations face in this area, this paper may serve as a useful case study subject to evaluate the importance of rescue and rehabilitation to conservation of wild animals in the state of Mizoram and may be replicable to other states of northeastern India as well.

All the animals listed in this data were rescued within Aizawl District, Mizoram or near it. Except for the cases in which animals had to be captured and retrieved from conflict situations, all the animals were brought by enthusiasts and presented to the authors who have undertaken the task of rescue and rehabilitation voluntarily. None of them are a part of any funded rescue program and all the expenses incurred have been borne by them.

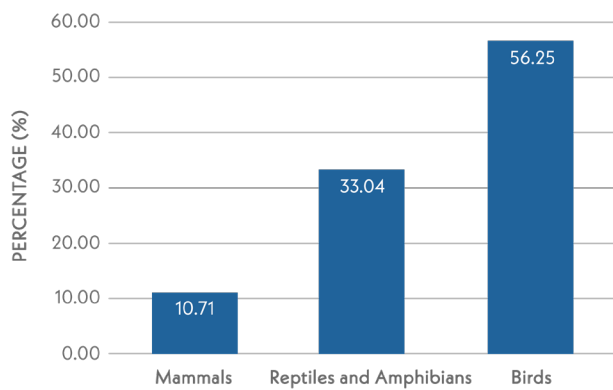


Figure 1. Percent of rescues from each taxa.

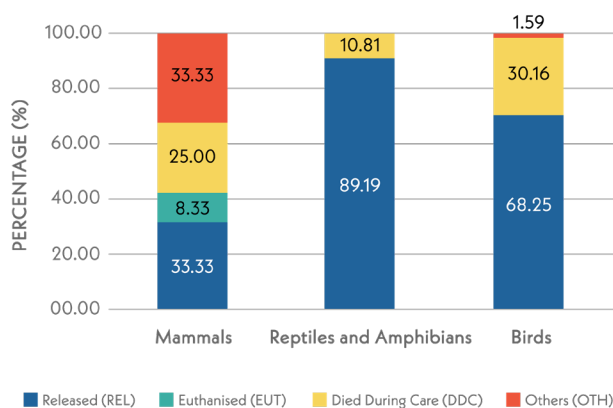


Figure 2. The outcome of the rehabilitation for each taxonomic representation.

Here we identified patterns of taxonomic representation and the outcome of the rehabilitation as percentage released (REL), died during care (DDC), euthanized (EUT) and others (OTH) (Figure 2). The causes of presentation and disposition were cases of orphaned, trauma, diseases and physical displacement in human habituated areas.

Numbers and composition of rescues

(Table 1; Figure 2)

Over a period of one and half years (January 2016 to July 2017), the authors took into their care, 112 wildlife displaced animals (Table 1). Apart from these 112 cases, a number of cases could not be attended by the authors since they all happened in other districts.

There is a marked predominance in the number of bird cases (N= 63). All the birds that died during care (N= 19) were presented to the authors with gunshot wounds. This could be attributed to the recent popularity and indiscriminate use of air guns in the state as reported by Chda (2018) in Zalen, a local newspaper. A lone case of displaced Burmese Green Peafowl *Pavo muticus spicifer* (Table 2) was presented to the authors by local women who found the bird adjacent to their jhum. The bird had clipped feathers and wounds indicating that it had probably escaped from captivity. Sailo et al. (2015) reported that *P.m. spicifer* was believed to be extinct in northeastern India in the wild owing to habitat destruction and hunting but in the same paper reported a one-time sighting of the extremely rare bird. After proper veterinary care was given and the bird was considered healthy, it was handed over to the state forest department (N= 1). Out of the 63 birds rescued, the birds that were considered healthy and capable to survive on their own were released back to the wild after care (N= 43).

The next predominant group in the record as shown in Table 1 are reptiles and amphibians. Most of the snake rescue cases arise from encounters where they have entered houses or premises of human settlements. A single case of injured Peacock Soft-shell Turtle *Nilssonina hurum* (Table 2) procured from market by an unidentified rescuer was presented to the authors. Once the animal was considered fit to survive on its own, it was released back to the area where it was said to have been initially caught. The snakes that died during care (N= 4) suffered severe injuries when they were presented to the authors. When snakes are in conflict

situations and caught in sudden encounters, be it outside and within human dominated areas, the usual tendency of people is to kill them as they are considered a threat to human life. Awareness and education could go a long way in changing the mindset of people to seek rescuers' help in addressing the conflict situation.

Twelve animals representing the mammalian taxa was presented to the authors for rehabilitation. Among these, four animals were released, three died during care, one animal had to be euthanized as it was suffering from critical injury with grave prognosis, while the remaining four non-releasable animals were handed over to the State Forest Department as they had suffered from injuries that resulted in permanent physical disability and their survivability in the wild was questionable.

Impediments in the reasons for rescue during presentation and ultimate diagnosis

The variables recorded on admission includes species, age (wherever possible), sex, location found (as reported by the person who presented the animal) and reason for presentation. The reason for presentation given by the presenters is invariably questionable as it could be completely different from the cause that actually led to their displacement. Similar impediments

have been reported by Grogan & Kelly (2013). All orphan cases were claimed to have been found alone in the forests or jhum fields, but true cause of displacement could well be killing of the parents, as hunting is rampant in the state and this has been uncovered in many of rescue cases.

It is also important to note that different taxa presented may not give the realistic picture of what species get most commonly displaced and what the most common cause of displacement is. Certain animals are more likely to be rescued than others as they being charismatic, are more likely to draw the attention of public. While many species are rescued only when they are disadvantaged or in danger of being persecuted, some demand removal and relocation only because they inflict fear in humans.

Survival under care (Figure 2)

71.42% (N= 80) of the casualties were released back to the wild, 0.89% (N= 1) had to be euthanized as they were suffering from imminently fatal injuries. The number of days an animal was kept under care varied, depending upon the severity of illness or injury. 23.21% (N= 26) died during care. The survivability of the animal also depends on the severity of injuries. Deep-seated wounds, bullet wounds on or near critical organs, complex fractures, and blood

Table 1. Numbers, composition of rescues, and outcome.

Species	Release (REL)	Euthanised (EUT)	Died during care (DDC)	Others (OTH)	Total
Birds	43 (68.25%)	-	19 (30.15%)	1 (1.58%)	63
Reptiles and amphibians	33 (89.18%)	-	4 (10.81%)	-	37
Mammals	4 (33.33%)	1 (8.33%)	3 (25%)	4 (33.33%)	12
Grand total	80 (71.42%)	1 (0.89%)	26 (23.21%)	5 (4.46%)	112

loss significantly determines the success of survival. In addition to the injuries, wild animals under human care are under immense stress due to handling and the alien environment they are in. Stress plays a significant role in determining the rate and success of a rehabilitation process as it is not conducive for recovery (Janssen et al. 2020). All the cases presented to us were given proper veterinary care regardless of the severity of injury and chances of survival upon admission.

Post-release survival and monitoring

All the released animals (N= 80; 71.42%) were released after they were considered fit to survive in the wild. Considering that only animals considered fit and healthy by the veterinarians were released, it is assumed that all the released animals will have a fair chance of survival in the wild.

Although in many cases, release of an animal is used as a measure of success, it does not define the ultimate success of a rehabilitation process. Successful wildlife rehabilitation has to be determined beyond recuperation and subsequent release, based on the successful integration of the animal back to their wild habitat and with their wild counterparts (Grogan & Kelly 2013). The documented cases in this paper do not include survivability post release as all these rescues and rehabilitation care were done voluntarily without any resources for tracking released individuals. All the animals documented in this paper were hard-released and were not supplemented with food. Soft-release simulates natural behavior by giving time to the animal to acclimatize with the new environment and hence, increases the survival chances but there is

no substantive evidence which supports that food provisioning post-release increases survivability and therefore, warrants further studies (Taylor 1993; Hall 2005; Saran et al. 2011).

Post- release monitoring is crucial not only to monitor the survivability and integration of the translocated individuals but also to monitor any possible adverse impact on the recipient population, as translocations of animals from one place to another can potentially result in changes in local abundance, distribution, and demography. It could also affect recipient populations through transmission and introduction of pathogens and disruption of genetic variability (Madsen et al. 1999; Roshnath & Jayaprasad, 2017; Berish et al. 2000).

Limitations and recommendations

Successful wildlife rehabilitation exceeds rescue operation, captive veterinary care and release, and therefore, the success must be gauged on the survivability of the released animals and their successful integration in the wild. In the present study, all juvenile/ orphaned cases, cases that resulted in permanent disabilities due to serious injuries, and animals that could not be released back to the wild were handed to the State Forest Department where quality life in captive or semi captive facility is assured. However, it is to be taken into account that housing a disabled animal in captivity could also inadvertently add to its suffering, and thus quality captive facilities are a must for providing lifetime care.

Presence of a properly organized center dealing with rescue and rehabilitation will not only address animal welfare by catering

Table 2. List of species rescued.

Category	Species (No of individuals)	Category	Species (No of individuals)
Birds	Burmese Green Peafowl (<i>Pavo muticus spicifer</i>) (2)	Birds	Tree Sparrow (<i>Passer montanus</i>) (4)
	Red-headed Trogon (<i>Harpactes erythrocephalus</i>) (2)		Himalayan Griffon (<i>Gyps himalayensis</i>) (2)
	Lesser Whistling Duck (teal) (<i>Dendrocygna javanica</i>) (4)		Cinnamon Bittern (<i>Ixobrychus cinnamomeus</i>) (1)
	Racket-tailed Drongo (<i>Dicrurus paradiseus</i>) (2)		Frogmouth (2)
	Red-vented Bulbul (<i>Pycnonotus cafer</i>) (8)	Reptiles and Amphibians	Indian Peacock Softshell Turtle (<i>Nilssonina hurum</i>) (1)
	Hoopoe (<i>Upupa upops</i>) (3)		Gunther's Tree Frog (<i>Zhangixalus smaragdinus</i>) (3)
	Orange-breasted Green Pigeon (<i>Treron bicinctus</i>) (2)		Red Neck Keelback (<i>Rhabdophis subminiatus</i>) (5)
	Common House Martin (<i>Delichon urbicum</i>) (3)		Green Pit Viper (<i>Trimeresurus erythurus</i> & <i>Trimeresurus popeiorum</i>) (8)
	Burmese Collared Scops Owl (<i>Otus lettia</i>) (3)		Burmese Python (<i>Python bivittatus</i>) (2)
	Brown Wood Owl (<i>Strix leptogrammica</i>) (4)		Mountain Pit Viper (<i>Ovophis monticola</i>) (3)
	Pale Blue Flycatcher (<i>Cyornis unicolor</i>) (1)		Black Krait (<i>Bungarus niger</i>) (3)
	Indian Roller (<i>Coracias benghalensis</i>) (2)		Monocled Cobra (<i>Naja kaouthia</i>) (4)
	White-throated Kingfisher (<i>Halcyon smymensis</i>) (1)		Asian Vine Snake (<i>Ahaetulla prasina</i>) (2)
	Malayan Night Heron (<i>Gorsachius melanolophus</i>) (2)		Twin Spotted Wolf Snake (<i>Lycodon jara</i>) (2)
	Little Spiderhunter (<i>Arachnothera longirostra</i>) (2)		Tawny Cat Snake (<i>Boiga ochracea</i>) (1)
	Shikra (<i>Accipiter badius</i>) (2)		Green Cat Snake (<i>Boiga cyanea</i>) (3)
	Peregrine Falcon (<i>Falco peregrinus</i>) (1)	Mammals	Hoolock Gibbon (<i>Hoolock hoolock</i>) (2)
	Common Moorhen (<i>Gallinula chloropus</i>) (2)		Indian Jackal (<i>Canis aureus</i>) (1)
	Asian Paradise Flycatcher (<i>Terpsiphone paradisi</i>) (1)		Slow Loris (<i>Nycticebus bengalensis</i>) (3)
	Grey Nightjar (<i>Caprimulgus jotaka</i>) (1)		Leopard Cat (<i>Prionailurus bengalensis</i>) (3)
	Green Billed Malkoha (<i>Phaenicophaeus tristis</i>) (1)		Burmese Ferret Badger (<i>Melogale personata</i>) (1)
	Hooded Pitta (<i>Pitta sordida</i>) (5)		Goral (<i>Naemorhedus griseus</i>) (2)

to distressed, displaced and injured wildlife, but also help provide information on local abundance, distribution of taxa, nature of threats to urban wildlife and biological attributes such as spatial and temporal patterns in activity and age structure of poorly known species (Shine & Koenig 2001). This information will help us fill the knowledge gaps in ecology and help the state agencies and conservation enthusiasts to understand the scope and magnitude of wildlife emergencies in the state.

In summary, this data collated from an informal rescue and rehabilitation team establishes the need for a trained, formal and functional rescue and rehabilitation system in the state of Mizoram which lies within a rapidly developing biodiversity hotspot area. It is to be kept in mind that rescue and rehabilitation should be conducted in consonance with sound scientific protocols as it could easily lead to disastrous events that threaten the wild populations with impediments to genetic variability, disturbing the demography and introduction of novel pathogens threatening both the recipient and source population.

Notwithstanding this, rescue activities also supplement crucial ecological information as has been the case with rescue and rehabilitation centers across the globe that provide data on the distribution of populations, local abundance of species and information on anthropogenic activities that are threats to wildlife and habitats.

It also gives information on what human activities drive conflict or what entails the requirement to remove an animal from its location due to perceived threat to humans,

and thus valuable information is gained on people's perception towards wildlife. When the entire rescue, rehabilitation and release data are collated through a centralized system, the analytical results could serve better in informing the managers on the threats faced locally by wild populations for better management and law enforcement.

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Bugs R All

Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

New records of butterflies *Prosotas bhutea* and *Zenonoida discreta discreta* from Nepal

Introduction

Among the 660 species of butterflies documented in Nepal (Smith 2010), there are several records which have limited data or species which have limited distribution range. Over time, however, with more research and the natural expansion of distribution range of those species, or some other phenomenon like climate change and migration, there are bound to be new records every now and then. Sometimes, species which were only once recorded before can be found again from same area after tens of years while some species which were recorded from only one location can be seen in a completely unexpected location at completely different elevation.



Prosotas bhutea. ©
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Study area.



Prosotas bhutea. © K.C. Sajan.

Prosotas bhutea (de Nicéville, 1884), commonly known as Bhutya Lineblue, is a small Lycaenidae with wingspan of 25–28 mm (Evans 1932). It was recorded for the first time in Nepal by Colin Smith in Pokhara at 820m amsl in December of 1970 in forest

streams (Smith 1989). Most of the *Prosotas* spp. look similar but there are only three tail bearing species in Nepal, viz., *P. nora nora* (C. Felder, 1860), *P. pia marginata* Tite, 1963, and *P. bhutea*, which could look very much alike. The key difference

among these species lies in the structure of bands on under fore wings (UnFW) and the shades of marginal and submarginal spots on under hind wings (UnHW). In *P. nora nora*, the submarginal and marginal spots on UnHW are equally dark and equally sharp, there is subbasal extension of midcell (MC) band and postdiscal (PD) band extension on sp. 1b of UnFW. On the other hand, in *P. pia marginata*, the HW submarginal marks are more washed out and dimmer than marginal spots, and on FW, the subbasal extension of MC band could be weak or even absent while PD extension on sp. 1b is well present.

Finally, in *P. bhutea*, the most distinguishing character is the complete absence of MC band on sp. 1b of UnFW while PD band is also restricted to v2 but can sometimes appear as a mere dot (Evans 1932), while the UnHW marginal spots and submarginal spots could look like those in *P. pia*. The former character, of course, is only noticeable when the FW is properly raised.

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Zenonoida discreta discreta (Elwes & Edwards 1897), commonly known as Himalayan Swift, previously in the genus *Polytremis* Mabille (1904), is a hesperiid which also has only been recorded from Pokhara before and that too, very recently. Smith (1989, 2011) mentions its presence in Nepal however, no data was available. Sajan (2020) confirmed its presence in Pokhara at 850m amsl. in the month of May 2019. I once again found it in Pokhara at the same spot in the month of November 2020. Later, it was also seen by Piet van der Poel at 1,490m amsl from Astam, Pokhara in October and eventually by me again in Hemja, Pokhara in April, 2021 at 1048 m amsl. Thus, so far this species was endemic to Pokhara in Nepal.

The wingspan of this insect is 34-37mm (Evans 1932). It can most frequently be confused with another similar species *Zenonoida eltola eltola* (Hewitson 1869) commonly known as Yellow-spot Swift but can be differentiated from the latter species by the presence of white cilia on HW tornal area



Zenonoida discreta discreta.
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(Evans 1949) which are yellow/ochraceous on *Z. eltola*.

Observations

Three individuals of *Prosotas bhutea* were encountered on a random photography walk just few meters away from my home in Lakeside, Pokhara (28.2161°N & 83.9633°E) 850 m amsl/ 2789ft. on 24 and 28 January, 2021. Among many *P. pia* fluttering by a forest stream there, I came across two *P. bhutea* which flew away shortly after some shots. I came across another one at the same place on 28 January. Since *Prosotas* are small and they were in such abundant numbers there (almost all were *P. pia marginata*), it is very much possible that I may have ignored some other individuals of *P. bhutea* in that place.

On my trip to Shaktikhor, Chitwan (27.7397°N & 84.6050°E), 410m amsl/1345 ft. in late November of 2020 with my partner Anisha Sapkota, I came across a nice hesperiid butterfly which I was surprised to identify as *Zenonoida discreta discreta*, because it's known to be found at higher altitudes. Van Gasse (2018) indicates that it is mostly found between 750 and 2400m amsl., this is the lowest elevation record of this species so far, and the first record outside Pokhara in Nepal. This new record was from about 81km south-east of the previous records.

Conclusion

These findings suggest that *P. bhutea* are still found in the habitat and location from where

they were first recorded in Nepal 51 years ago i.e. in 1970, although they fly with their cousins and thus can frequently be missed, and *Zenonoida discreta discreta* might have expanded its distribution to the lowlands or it was always there at first place.

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Record of melanistic Leopard in Nepal

Leopards *Panthera pardus* (Linnaeus, 1758) are extant and generalist across Africa and Asia, but unfortunately the populations have been diminishing, fragmented and even extinct from large portions of their historic range (Stein et al. 2020). In Nepal, the National Red List shows this species as 'Vulnerable' with regular incidences of conflict with humans in different parts of the country. Unlike other large carnivores, Leopards have thrived in human dominated landscapes because of their highly adaptable nature with varied habitats and wide range of wild and domestic prey species (Hunter 2011).

However, this species has been sharply reduced due to increased anthropogenic activities such as habitat fragmentation, unsustainable trophy hunting, poaching, illegal body parts trade, prey base decline, and negative interactions with humans (Jacobson 2016). Report of IUCN mentions, of nine sub-



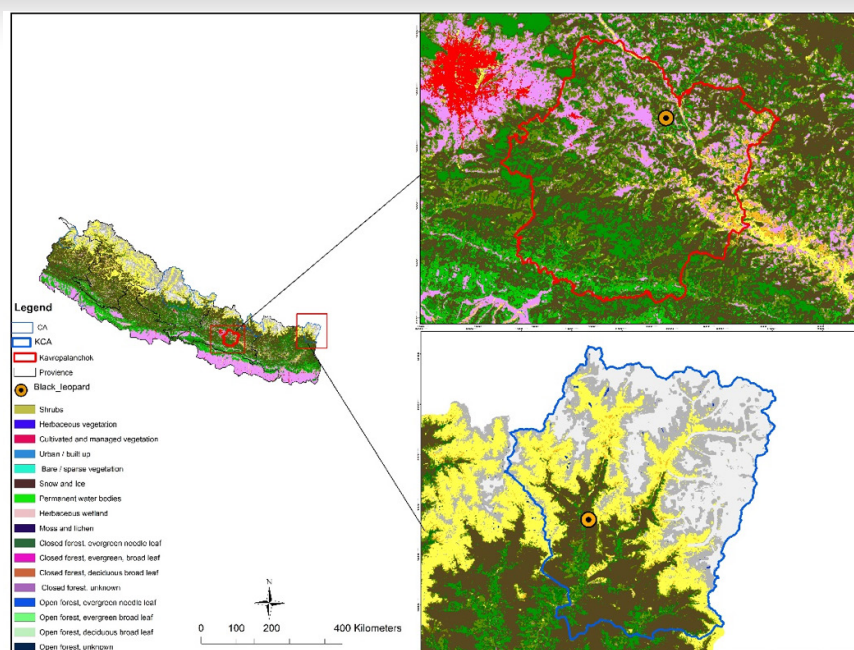
A dead melanistic leopard found in Kavrepalanchok district of Central Nepal (Source: Division Forest Office, Kavrepalanchok, 2021).

species of leopards, three subspecies are Critically Endangered and two are Endangered, though as a species it is considered as Vulnerable on the IUCN Red List (Stein et al. 2020).

Melanism, dark external pigmentation which is associated with thermoregulation, camouflage, aposematism, susceptibility or response to disease, sexual selection and reproductive success is commonly recorded in different groups of animals (Cook et al. 2013). A gene named Agouti Signaling Protein plays a vital role

in melanism of leopards (Schneider et al. 2015) and is inherently recessive (Robinson 1970). The importance of melanism is not specified yet but suggestion was made that environmental factor especially associated with tropical and humid condition could favor it (da Silva et al. 2017).

Several studies have been conducted with regard to melanistic leopard which was observed in nine different countries, viz., Thailand (Kawanishi et al. 2010), Ethiopia, India, Nepal, Indonesia, Bhutan, Malaysia,



Locations of melanistic leopards found in Kavrepalanchok District (this study) (red boundary) and Kangchenjunga Conservation Area (blue boundary).

Table 1. Details of melanistic leopard observed in Kavrepalanchok District of Nepal.

	Features	Details
1.	Sex	Male
2.	Length	6 feet
3.	Weight	50 kg
4.	Height	3 feet
5.	Age	10 years (Approx.)
6.	Location	Human dominated landscape (near to a community forest)
Source: Division Forest Office, Kavrepalanchok 2021.		

Sri-Lanka (da Silva et al. 2017), and Kenya (Pilfold et al. 2019). Melanism is a rare event as the sightings are very few in forested habitats. da Silva et al. (2017) mentioned that in 11 different biomes, melanism was only observed in four of them and was most common in tropical and subtropical moist forests, Javan forests, Kayah-Karen/

Tenasserim forests and Peninsular Malaysian rain forests. In Nepal, the recent sighting was made in hilly region of Nepal where human settlements are nearby.

Previously, melanistic leopard was observed in Nepal inside protected area with an altitude of 4,300m (Thapa et al. 2013). Studies show

human-leopard interaction and illegal trade on its body parts are increasing specially in mid-hilly region of Nepal. With these context, melanistic leopard may possess augmented threat due to its unaccustomed appearance (Hindu mythos reckon black colour as unfortunate or dangerous or risky) coupled with conflict with humans and its illegal trade. So, to conserve this species, community awareness, effective law enforcement and appropriate human-leopard interaction mitigation measures should be adopted in an integrated approach.

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Population survey of the highly threatened *Gyps* vultures in Sathyamangalam and Mudumalai tiger reserves, Tamil Nadu, India

Introduction

Vultures execute a vital role in nature's sanitation process (Houston 1974) and reduce the potential spread of diseases that affect other animals and humans (Ogada et al. 2012a). Nine species of vultures are recorded in India: six are found in southern India (Ali & Ripley 1987) of which two are migrants or vagrants (Srinivasulu & Srinivasulu 1999; Sashikumar 2001; Subramanya 2001; Davidar & Davidar 2002; Thejaswi 2004; Subramanya & Naveen 2006; Davidar 2007; Umapathy et al. 2009; Ramakrishnan et al. 2010, 2012, 2014; Praveen et al. 2014; Samson et al. 2014; Samson et al. 2015; Samson et al. 2016a,b). Fourteen of the world's 23 (61%) vulture species are threatened with extinction of Asia and Africa (Ogada et al. 2012b). The decline of vulture populations in the Indian subcontinent since the 1990s was reported extensively (Prakash 1999; Prakash & Rahmani 1999; Virani et al. 2001; Prakash et al. 2003; Gilbert et al. 2004; Chhangani 2005). The main cause of these declines, is found due to veterinary drug diclofenac (Oaks et al. 2004; Green et al. 2004, 2007; Cuthbert et al. 2006; Prakash et al. 2012). Both Egyptian and Red-headed Vultures have declined in parallel to *Gyps* vultures in the Indian subcontinent, and also considered to be susceptible to diclofenac poisoning

(Green et al. 2004; Cuthbert et al. 2006).

Therefore, these vultures are listed as Critically Endangered with high risk of global extinction (IUCN 2017) and are categorized under Schedule I of the Indian Wildlife (Protection) Act of 1972 (GOI 2002).

Materials and Methods

Study Area

The Moyar river extending from Mudumalai to Bhavanisagar bisects the two tiger reserves of Bandipur in Karnataka and Mudumalai in Tamil Nadu and continues its journey through Sathyamangalam Tiger Reserve (STR) (11.4667°-11.8000° N, 76.9167°-77.4500° E). This valley is a significant elephant corridor and tiger habitat in the Nilgiri Biosphere Reserve, the avifauna of this region has not been explored much, compared to work on mammals. Sathyamangalam forest range is a significant wildlife corridor and a sink habitat.

Mudumalai Tiger Reserve (MTR) (11.5333°-11.7167° N, 76.3667°-76.7500° E) lies on the northern flank of the Nilgiri Mountain Range in the Western Ghats and is contiguous with Wayanad Wildlife Sanctuary (WWS) in the west, Bandipur Tiger Reserve (BTR) in the north and Nilgiri North Forest Division (NNFD) in the south. The MTR also forms part of the Nilgiri Biosphere Reserve (NBR) as STR.

Methodology

In the survey a total of 10 camps were selected, five in Sathyamangalam Tiger Reserve and five in Mudumalai Tiger Reserve, each consisting of two observers and two forest department staff. The teams surveyed the parts known as vulture niches in STR and MTR along the Moyar river and valley. Surveys started between 0630 h and 0730 h and finishing between 1700 h and 1800 h depending upon visibility factor. Vultures observed on the ground, in trees, on cliffs, in nests, flying and soaring during the survey were identified and recorded. The survey was conducted in March 2019. This period was chosen because it coincides with the end of the vulture breeding season. All were fully-grown birds and our counts did not include nestlings at breeding sites. As vultures are large birds, they were easy to detect even in distance without optical equipment but identification of species was done using binoculars and pictures shot with zoom lenses. Observers walked without causing disturbance to the nesting or roosting vultures during the survey in both the tiger reserves.

Results and Discussion

The most common vulture species recorded during the synchronized survey is White-rumped Vulture, which was about 200 individuals. The reason could be that they are the major breeders and their preferred nesting places are in the Segur Plateau. Though the survey was carried out at the end of the nesting season (end of March), the survey team could record about 30 active

nests belonging to White-backed Vulture. The record of Long-billed Vultures during the synchronized survey is encouraging as many were seen at different locations contrary to the expectation that they are very few (Venkitachalam & Senthilnathan 2015; Anoop et al. 2018). However, there is a need for more systematic scientific work to be carried out about their breeding niches in this landscape. The sheet rock crevices adjoining Thullukkampatti anti-poaching camp (APC) and Eastern Ghats near Talamalai in Sathyamangalam Tiger Reserve (STR) are to be constantly kept in watch. They were around 20 numbers.

During this survey, the King Vultures were sighted in less numbers though they were in good numbers during the previous surveys, coming somewhere near 18. However, no nesting was recorded during this survey for this species. Earlier, they used to nest at Anaikkal along with White-rumped Vulture (Arundavaselman pers. comm. 2008). Similarly, one nest of King Vulture was reported from Singara by Dr. Vasanthan (pers. comm. 2016). The old records also indicate that they were not in huge numbers (Nilgiri Gazetteer 1920). A sustained and exhaustive survey has to be done on their nesting in this valley.

However, this survey has recorded a high count of juvenile vultures of both White-rumped and Long-billed. Based on the observation, this certainly underlines the fact that the nesting has been successful. In addition to this, a single juvenile Cinereous

Vulture was also recorded during this study. The results show that the entire Moyar Valley is used by vultures almost equally, that is, in the Mudumalai Tiger Reserve buffer zone and in Sathyamangalam Tiger Reserve. Interestingly, there are some observations of juvenile Himalayan Vulture associated with Long-billed and White-rumped vultures were recorded near Gulithuraipatti area in 2012 (Vasanthan pers. comm.); another record in 2016 at Aadicomбай (Chandrasekar pers. obs.) and very recently in 2018, near Bannari and Dimbum area (Omprakash pers. comm.). Similarly, juvenile Cinereous Vulture was sighted for two consecutive years (March 2018 & 2019) in this landscape, at Moyar, Thengumarahada and Doddarkal areas. It is interesting to note that the juvenile Griffons have a tendency to migrate long distances away from their reported range. (Praveen et al. 2014).

The survey team observed that the White-backed Vulture, Long-billed Vulture, King Vulture, and Cinereous Vulture landing at Doddarkal area in the evening at around 1630 h for a drink presumably, which was latter verified by the survey team on the next day evening. Therefore, vultures do have some spots of congregation, apparently at water holes. This was corroborated by the observation of the synchronized vulture survey team at Adirapatti area where also at a water hole they were congregating.

The Nilgiri district Gazeteer, has mentioned that Egyptian Vultures were very common around Badaga villages. Interestingly, they

are not sighted in this synchronized vulture survey, the last record was in 2007 and before that in 2002. It is surprising when they can adapt to civilization better which was documented by the NDTV at the Kanpur dump yard in Uttar Pradesh; also reportedly nesting in Bengaluru and Mysore areas.

At this landscape in 1980's ERC Davidar observed the population crash of vultures. (Vulture News 42). This may possibly relate only to that period, where he attributes the reason to poisoning of carcasses of tiger kills, which was also confirmed by AJT Johnsingh (pers. comm. 2019). In 2014, 10 vultures had died in Segur nallah, however the reason for its death could not be traced. Moyar valley is the least studied area with respect to vultures over the last few decades and therefore to arrive a base data is very difficult.

The total number of all the four species of vultures recorded in the Moyar Valley may be put about 250 individuals, which is excluding observer bias. However, this is not an accurate population to arrive at a conclusion for this landscape but a better approximation. Therefore synchronized survey has to be done at periodical intervals and at different points of time in both STR and MTR, principally during the breeding season to assess the population status of vultures. The methodology may also be fine-tuned further to suit the landscape and the unique niches for nesting. On the other hand, the entire Nilgiri Biosphere Reserve (including areas in Wayanad in Kerala and Karnataka) can be surveyed when we take into the account of

the nests for consideration. This alone can give an exact idea about the distribution of Gyps Vultures in NBR, since the fact remains that the entire Nilgiri Biosphere Reserve (NBR) is the vast foraging ground for these critically endangered birds.

The vulture population in this landscape that exists at present is precariously small and will remain vulnerable to adverse events. Hence, it is time to establish a more robust long-term strategy for the recovery and future conservation of the vulture populations of Moyar Valley complex comprising of STR and MTR. Occurrence of viable population of prey and predator base in the Moyar Valley supports the vultures present in this landscape with adequate food. Therefore studies on this species in the Moyar Valley are necessary.

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A recent sighting of Black Stork from Jhapa District, Nepal

Hataymalo Community Forest of Mechinagar Municipality 13 in Jhapa District is reminiscence of 'Charkose Jhadi', a dense forest in southeastern Nepal that runs along the East-West Highway. Amidst this tropical Sal forest is situated an artificial wetland, locally known as 'Nichajhoda Simsar'. The wetland is covered with aquatic vegetation and it apparently supports breeding water birds like Lesser Whistling-Duck *Dendrocygna javanica* and Bronze-winged Jacana *Metopidius indicus*. Herein, we report the sighting of Black Stork *Ciconia nigra* previously not seen in this area. On 25 November 2020, during a birding trip to Nichajhoda wetland we had an observation on a lone stork perching on

a dead Sal tree *Shorea robusta* (26.627°N, 88.053°E; 122 m). The bird was identified as juvenile Black Stork based on its brown head, white underparts and greyish-green legs and bill (Grimmett et al. 2016). It rested for 15 minutes on the same spot giving us an ample opportunity to photo document the species. Next, on 1 December 2020 at 1400 h, we sighted another Black Stork on flight at the same spot. The overall glossy black plumage with white underparts and long pointed red bill and legs confirmed it to be an adult Black Stork.

Although a Least Concern species in IUCN Red List of Threatened Species, the Nepal Red Data Book categorizes the Black Stork as Vulnerable and the species is legally protected under the National Parks and Wildlife Conservation Act 1973. It is a widespread winter visitor in Nepal below 1,000 m (Inskipp et al. 2016) with documented sightings in few and scattered pattern, and mostly concentrated at Koshi Tappu Wildlife Reserve in eastern lowlands. The sighting of both a juvenile and an adult at the same site could signify it as the potential locality where the species regularly winter visits outside Koshi Tappu, a well-known site for visiting Black Storks in eastern Nepal. The previous record from the closest area includes the sighting of nine Black Storks at Khunjunabari (now Khudunabari) in January 1974 (Madge et al. 1974) and one at Damak in December 1978 (Bowden 1979). The present sighting is the most recent record so far, indicating the sporadic presence of Black Stork in Jhapa District. The

Adult Black Stork
during flight on
01 December
2020. © Sandeep
Chhetri Luitel.



observation could well support the representation of scattered sightings of the species outside of protected areas in lowland Nepal, as documented by Inskipp et al. 2016.

Nichajhoda is considered a healthy wetland ecosystem as it is undisturbed from human activities and rich in biodiversity which might have favoured the Black Stork. However, at recent times, the place is quickly gaining popularity as a new picnic spot and popular tourist destination. Such activities are likely to affect this only

potential habitat of the species in the area, therefore a need for disseminating knowledge to local stakeholders is felt to ensure the protection of wetland birds and their habitat. The loss and degradation of wetlands is considered a major threat for the survival of Black Storks (BirdLife International 2020). This documentation also provides a valuable insight into the national assessment of a nationally threatened and priority protected species (Schedule-I, NPWC Act 1973), in a context where assessment holds ground of occasional and scattered sightings in the country in terms of distribution, movement and population trend as well.



Juvenile Black Stork perching on a dead Sal tree on 25 November 2020. © Sabin Adhikari.

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Status of Brahminy Kite *Haliastur indus* (Boddaert 1783) in Rameswaram Island, Tamil Nadu, India

Introduction

Raptors are wide ranging avian species occupying high trophic level, excellent indicators of biodiversity health, and provide critical ecosystem services (Newton 1979; Thiollay 1992; Redpath & Thirgood 1999). The Brahminy Kite *Haliastur indus* (Boddaert 1783) (Aves: Accipitriformes: Accipitridae) occur in India, Nepal, Bhutan, Pakistan, Sri Lanka, China, Taiwan, Thailand, Vietnam, and United Arab Emirates (BirdLife International 2016). The species inhabits coastal areas, mangrove-backed intertidal flats (Wells 1999; Robson 2002), and large inland lakes up to 3,000 m (MacKinnon et al. 2000; Ferguson-Lees & Christie 2001). In India, this species is distributed along tidal creeks, docks, dammed reservoirs, rivers, flooded areas (Ali & Ripley 1987), towns, waste dumps, and close to human habitations for construction of nests (Anoop et al. 2018). Few studies have documented nest site-fidelity (Balachandran & Sakthivel 1994) and sunbathing behaviour of the species (Sanuraj & Cherian 2020). The breeding biology of this raptor species was documented in Thanjavur and Thiruvarur districts of Tamil Nadu (Sivakumar & Jayabalan 2004). Globally, the general population trend of this species is decreasing and is declining in some parts of Java (van Balen et al. 1993). As per the IUCN Red List category, the status of this species is 'Least Concern' (BirdLife International 2016). Raptors have low population density, and are sensitive to anthropogenic threats

and habitat alteration. In Tamil Nadu, only few literatures are available on the quantitative study and other behaviours of this species especially, pertaining to Rameswaram island of Tamil Nadu. The present study is conducted to create baseline information and to assess the present status of this species, number of individuals enumerated, distribution, behaviours and interactions with other bird species in and around Rameswaram Island.

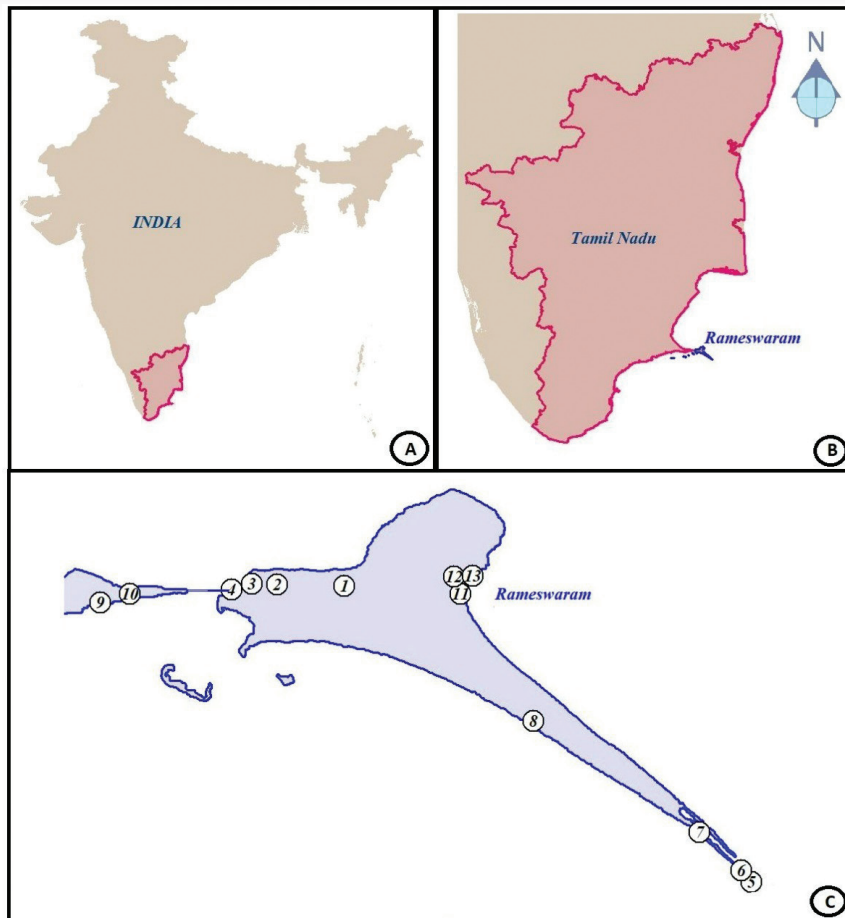
Materials and Methods

Study Area

Rameswaram is the largest island in the state of Tamil Nadu located in Ramanathapuram District, with an area of about 67 km². As per the 2011 census, the human population of the island is 82,675. The island is devoid of traditional crop cultivation. However, tourism, pilgrimage, fishing and palm products are the major sources of income for the people. The average annual rainfall is about 80mm with maximum and minimum annual temperatures of 36°C and 20°C, in the district respectively (www.ramanathapuram.nic.in) (Figure 1).

Methods

With the help of two field assistants, we identified different habitats of Brahminy Kites such as intertidal coasts, fishing harbours, areas of fish processing and transport, human dwellings, garbage dump yards (including dumping of slaughterhouse wastes) located at 13 sites (names listed in



Study area map. (A) India map showing Tamil Nadu, (B) Tamil Nadu indicating Rameswaram Island, and (C) Names of the 13 study sites viz., 1. Thangachimadam, 2. Akkamadam, 3. Pamban Bridge, 4. Pamban Fishing Harbour, 5. Dhanushkodi Road, 6. Dhanushkodi Beach, 7. Dhanushkodi Light House, 8. Kothandaramar Shrine, 9. Mandapam Fishing Harbour, 10. Kovilvadi Fishing Harbour, 11. Rameshwaram Fishing Harbour, 12. Muthusavadi, and 13. Agnitheertham Beach.

Figure 1) in Rameswaram Island and adjacent Pamban areas. At each survey site, individuals were counted by direct count method (Bibby et al. 2000) at 0800 h and repeated at 1600 h in the from 01 January to 25 February, 2021. Census was made during every fortnight and a total of four censuses were made during the study period and the numbers were

arithmetically averaged to get a representative value. In order to avoid repeated counts, census was carried out fortnightly basis and each team had surveyed 6–7 sites in a single day. Birds observed over sky were taken at multiple places in the residential areas. In the remaining days direct visual observations were made through binoculars

on activities such as flying, catching prey, eating fishes in flight, sunbathing, roosting, carrying nest materials, nesting, and interactions with other birds from 0600 to 1800 h. Locations of all the sites were recorded using a standard GPS (Garmin Etxox 20x). Photographs and videography were made using a Nikon P1000 digital camera without disturbing the birds and their nests.

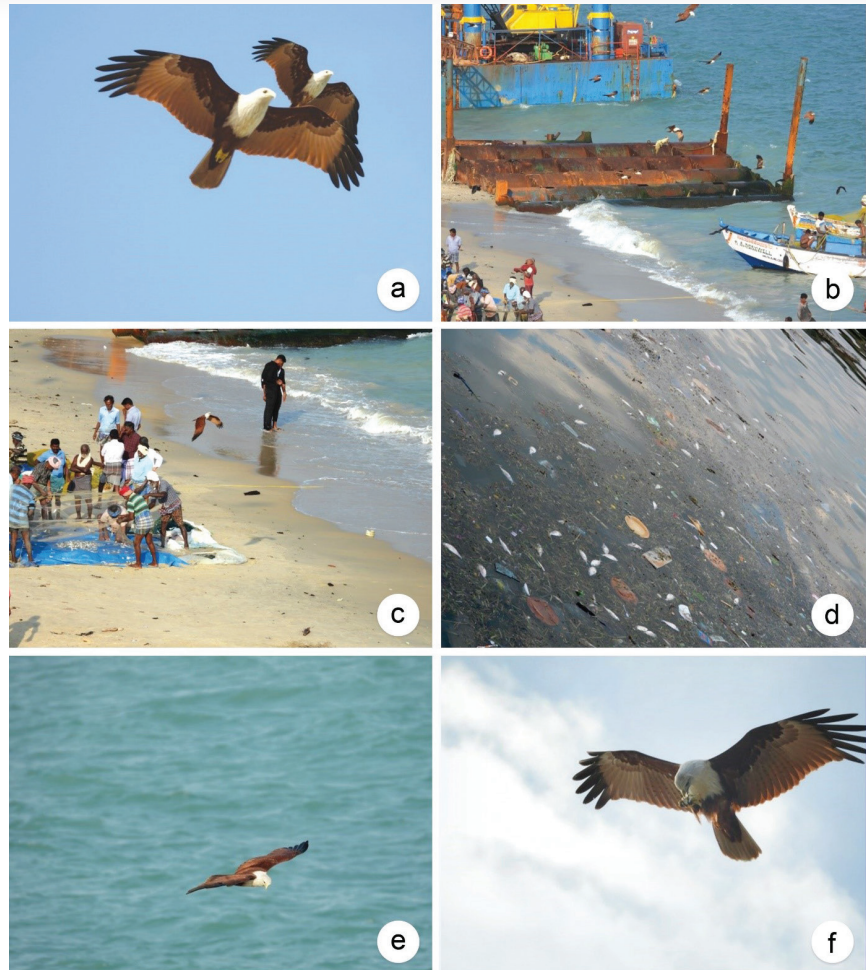
Results and Discussion

The census was conducted fortnightly during the mornings (0800 h) and evenings (1600 h) at 13 locations in the Rameswaram Island and adjacent Pamban fishing harbour during January-February 2021 and the numbers were arithmetically averaged. A total of 217 adults *H. indus* were enumerated, i.e., 239 individuals were counted in the morning and 195 individuals were counted in the evening (average was 217). It indicated that the birds were found more active in the morning and less active in the evening hours. In the fishing harbours the individuals of *H. indus* appeared more in morning as fishing activities of fishermen

including unloading of fish caught and transportation would be more during morning hours. Out of 217 individuals, 12.9% birds ($n=28$) were found flying over residential areas, 67.7% birds ($n=147$) were found preying on spill over fish in the coastal water in and around fishing harbours, 16.1% birds ($n=35$) were found flying above municipal garbage dump yards, 1.4% birds ($n=3$) were found roosting on the beach, and 1.8% individuals ($n=4$) were observed in and around nests.

Prey

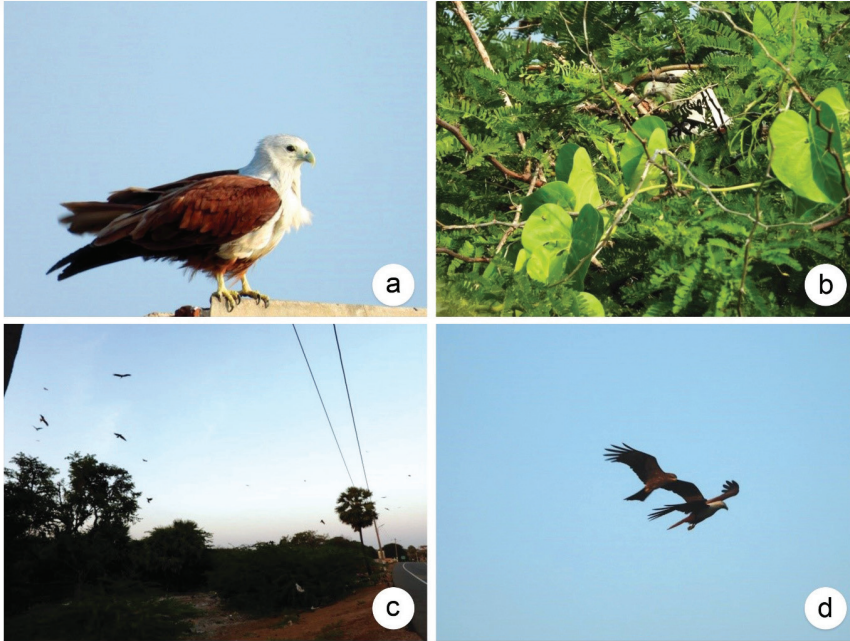
Out of 217 individuals enumerated, 67.7% individuals ($n=147$) were found flying above fishing harbours ($n=4$) and processing areas. A maximum of 160 individuals appeared in the fishing harbours in morning and 134 individuals were found in the evening. Since fishing harbours were more active in the morning, more individuals appeared during the morning hours. In 530 incidents, the *H. indus* individuals came to the sea coast and took spill over fishes from nets and boats, and most of the time they consumed the



Foraging habits of *Haliastur indus*. (a) A pair in flight, (b) Group of *H. indus* individuals flying around boats in fishing harbour, (c) Individual coming close to humans to catch spill over fish from nets, (d) Dead spill over fishes floating in the water, (e) Individual coming close to water surface to lift floating dead fishes, and (f) Ingestion of fish in flight. © M. Pandian.

fish while in flight and no incidents of carrying the prey to nearby trees, docked boats or man-made structures like electricity poles, roof of building, and mobile-phone towers for feeding were noticed during the survey. In 243 incidents, the flying individuals took away small fishes which were spilled over on the ground during the processing and transport of

fish caught. Janra (2017) had observed the behaviour of individuals of *H. indus* eating fish in flight in West Sumatra. Moreover, eating of fish in flight might be to circumvent kleptoparasitism (Kalsi & Kaul 1992). The present observations in Rameswaram area, corroborate the findings of Janra (2017) and Kalsi & Kaul (1992).



Nesting of *Haliastur indus* and interactions with other birds. (a) One of the pair roosting adjacent to nest, (b) Probably incubating eggs, (c) Individuals of *H. indus* flying above garbage dump yard, and (d) Black Kite chasing Brahminy Kite. © M. Pandian.

The study revealed that 16.13% individuals ($n=35$) were found hovering over municipal garbage dump yards where dumping of slaughterhouse wastes was happening generally from 0600 to 1830 h daily. This raptor depends on slaughterhouse wastes for food in urban areas of Java (Newton 1979). The appearance of individuals at municipal garbage dump yards where it was observed to feed on slaughterhouse wastes matches with the observations made by Newton in 1979. The study also revealed that 12.90% individuals ($n=28$) were found flying above residential areas

probably searching for prey. Hence, 96.77% ($n=210$) of enumerated individuals were foraging on fish at fishing harbours, slaughterhouse wastes and searching prey above human habitations. The remaining 2.23% individuals ($n=7$) were found in nest, roosting on wall, and over the beach.

Sunbath

On 10 February 2021, two individuals were found taking sunbath on Dhanushkodi coast and another one was found roosting on an abandoned wall. Sanuraj & Cherian (2020) had stated that incidents of *H. indus* individuals sunbathing were

observed at Kappad beach, Kozhikode District of Kerala which is in confirmation with the present observation of sunbathing.

Nests

Two nests, one hidden amongst dense vegetation of *Prosopis juliflora* at a height of six meters in an uninhabited area near Dhanushkodi light house and the other nest was observed at 11 m height on a *Cocos nucifera* L. (Arecaceae) tree in a residential (Muthusavadi) area. Between 03 and 12 February, 2021, two adults were observed carrying dry sticks and twigs from the shore to the nest under construction on *P. juliflora*. Wells (1999) had stated that muddy and mangrove backed intertidal coasts were the primary habitats for *H. indus*. In the present study also, this species had selected short trees situated on waterlogged intertidal coast for construction of nests. Hence, it corroborates partly with the views of Wells (1999). Balachandran & Sakthivel (1994) had stated that the individuals of *H. indus* exhibited nest-site fidelity and also observed nests on the ground. In the present study, no nest was

Table 1. Details of survey sites, number of *Haliastur indus* counted and their behaviours.

	Study sites and GPS	No. of <i>H. indus</i> counted in morning (0800 h)	No. of <i>H. indus</i> counted in evening (1600 h)	Average no. of <i>H. indus</i>	Flying	Preying	On the ground/wall	In the nests	In/above garbage dump yard
1	Thangachimadam 9.2846° N, 79.2622° E	21	17	19	0	0	0	0	19
2	Akkamadam 9.2854° N, 79.2317° E	12	8	10	10	0	0	0	0
3	Pamban Bridge 9.2840° N, 79.2144° E	20	12	16	0	0	0	0	16
4	Pamban Fishing Harbour 9.2831° N, 79.2109° E	52	40	46	0	46	0	0	0
5	Dhanushkodi Road 9.1502° N, 79.4474° E	3	5	4	4	0	0	0	0
6	Dhanushkodi Beach 9.1555° N, 79.4428° E	4	2	3	0	0	3	0	0
7	Dhanushkodi Light House 9.1728° N, 79.4237° E	2	2	2	0	0	0	2	0
8	Kothandaramar Shrine 9.2234° N, 79.3483° E	4	4	4	4	0	0	0	0
9	Mandapam Fishing Harbour 9.2770° N, 79.1512° E	20	16	18	0	18	0	0	0
10	Kovilvadi Fishing Harbour 9.2811° N, 79.1646° E	37	35	36	0	36	0	0	0
11	Rameshwaram Fishing Harbour 9.2811° N, 79.3150° E	51	43	47	0	47	0	0	0
12	Muthusavadi 9.2862° N, 79.3107° E	2	2	2	0	0	0	2	0
13	Agnitheertham Beach 9.2891° N, 79.3206° E	11	9	10	10	0	0	0	0
	Total	239	195	217	28	147	3	4	35

observed on the ground along the coasts of Rameswaram Island. Continuous monitoring of nests during successive breeding seasons will throw more light on the possibility of nest site-fidelity. The present survey didn't focus on the nesting and breeding activities of this raptor.

Interactions with other birds

Interspecific interactions existed between

H. indus and other birds such as Black Kite *Milvus migrans*, House Crow *Corvus splendens*, Large-billed Crow *Corvus macrorhynchos*, Black Drongo *Dicrurus macrocercus*. Among these interactions, the highest number (n= 84) incidents of *C. splendens* chasing *H. indus*, followed by *C. macrorhynchos* (n= 43) and *D. macrocercus* (n= 14) were observed during the present survey. Overlapping of feeding

among various birds' species create interspecific competitions for sharing of food resources (Pohajdak 1998). Vice-versa kleptoparasitism was observed between *H. indus* and *C. splendens* at dumping sites of slaughterhouse wastes (Bolen & Robson 2002). In the present study also, three incidents of competitions with *M. migrans* and 12 incidents with *C. splendens* over sharing of slaughterhouse wastes were noticed. Incidents of *Dicrurus macrocercus* chasing individuals of *H. indus* were observed above the open ground and residential areas. The availability of abundant fish and slaughterhouse wastes and non-use of pesticides might have been the reasons for the existence of this species in substantial numbers in the island including Pamban fish landing area. The enumeration of 217 individuals in the island and Pamban areas will form a baseline data for future study on the ecology and breeding of this species. A detailed systematic survey on the population status, foraging behaviour and breeding of this species covering the entire State may be useful in drafting an action plan to conserve this species from possible decline in future.

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An anecdote of Jacobin Cuckoo parasitizing the Jungle Babbler brood at Bayana, Rajasthan

The Jacobin Cuckoo *Clamator jacobinus* (Boddaert, 1783) also known as Pied Cuckoo, is found in Africa and the Indian subcontinent (Payne & de Juana 2020). In the northern part of the Indian subcontinent, it is a summer visitor ranging from the Indus valley, Pakistan to the west of Assam, India, in the east. The species is known to reside and breed in the Indian subcontinent during early June to October while the migratory population winters in Africa (Gaston 1976; Ali & Ripley 1983; Nahid et al. 2016). The species is also a resident in the southern part of India (Rasmussen & Anderton 2012). The Jacobin Cuckoo has a long list of hosts, though the well-known and confirmed host species are Jungle Babbler *Argya striata*, Yellow-billed Babbler *Argya affinis*, Common Babbler *Argya caudate*, Large Grey Babbler *Argya malcolmi*, Rufous Babbler *Argya subrufa*, and Streaked Laughingthrush *Trochalopteron lineatum* (Praveen & Lowther 2020). At Bayana, Bharatpur District of Rajasthan, our



field station was located in a rented house that was surrounded by mosaic of crop-fields and congested settlements (26.91°N 77.29°E). On 04 October 2003, in the evening, a flock of 8–10 Jungle Babblers *Turdoides striata* was seen in the garden. The flock members descended one by one, close to me, on the ground. While descending, the flutter and chirruping calls

of the first five individuals was same but the last one appeared a bit different. It was the fledgling of Jacobin Cuckoo following the flock and producing similar call as that of its foster parents. The flock had two fledglings of the host species as well, but the cuckoo young one was grabbing all the attention and was fed more frequently than the Jungle Babbler fledglings. The ability of the Jacobin

Cuckoo's nestling and fledgling to mimic the call of its hosts is documented in case of Yellow-billed Babbler *Turdoides affinis* and Southern Pied Babbler *T. bicolor* (Jamie & de Silva 2014) and in the Common Fiscal *Lanius collaris* (Liversidge 1969). Nestling mimicry in brood parasitic bird species serves to avoid rejection altering parental provisioning and competing with host nest-mates (Jamie & Kilner 2017). A detailed study on *Vidula* species in Zambia has recorded qualitative and quantitative evidences of mimicry in case of the 'mouth marking pattern and colour, begging calls, and postural displays' by the parasitic nestling (Jamie et al. 2020). The co-evolution of acoustical communication between obligate avian brood parasites and their hosts has been well reviewed (Wang et al. 2020).

As the fledgling was found in October, it could be the third brood of the Jungle Babblers for that year as stated by Gaston in 1976. In the 'abundance animation' for the breeding phase of this species by eBird, northwestern India becomes the hotspot during June–August and the population recedes from northern India after November (Fink et al. 2020). As the fledgling was observed in first week of October, it would be interesting to know how quickly the young bird started its migration to Africa.

This brief description with photographic record is an additional site record for the species. The mimicry of the call of Jungle Babbler by the fledgling of Jacobin Cuckoo appears an additional information to science, related to behavioural patterns of the birds for survival.

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Xylaria badia - a new distribution record of the deadwood fungus from Karnataka

Xylaria badia was first described by Patouillard (1891) which belongs to the family Xylariaceae (Xylariales). Members of Xylariaceae are one of the important components of terrestrial ecosystems. They play a vital role as decomposers, plant pathogens, and endophytes. Species of *Xylaria* has been recorded in most of the countries and hence considered as largest genus in the family and abundant in tropics and subtropics. According to Index Fungorum so far about 670 records of *Xylaria* have been reported from all over the world (Hyde et al. 2020).

They are characterized by erect stroma, varying in shape from cylindrical to clavate, or irregularly shaped with fertile parts, cylindrical asci with eight ascospores and a J+ apical ring in Melzer's reagent (Okane et al. 2008; Karun & Sridhar 2015; Daranagama et al. 2016).

During the exploration of Xylariaceae, one of the species was encountered

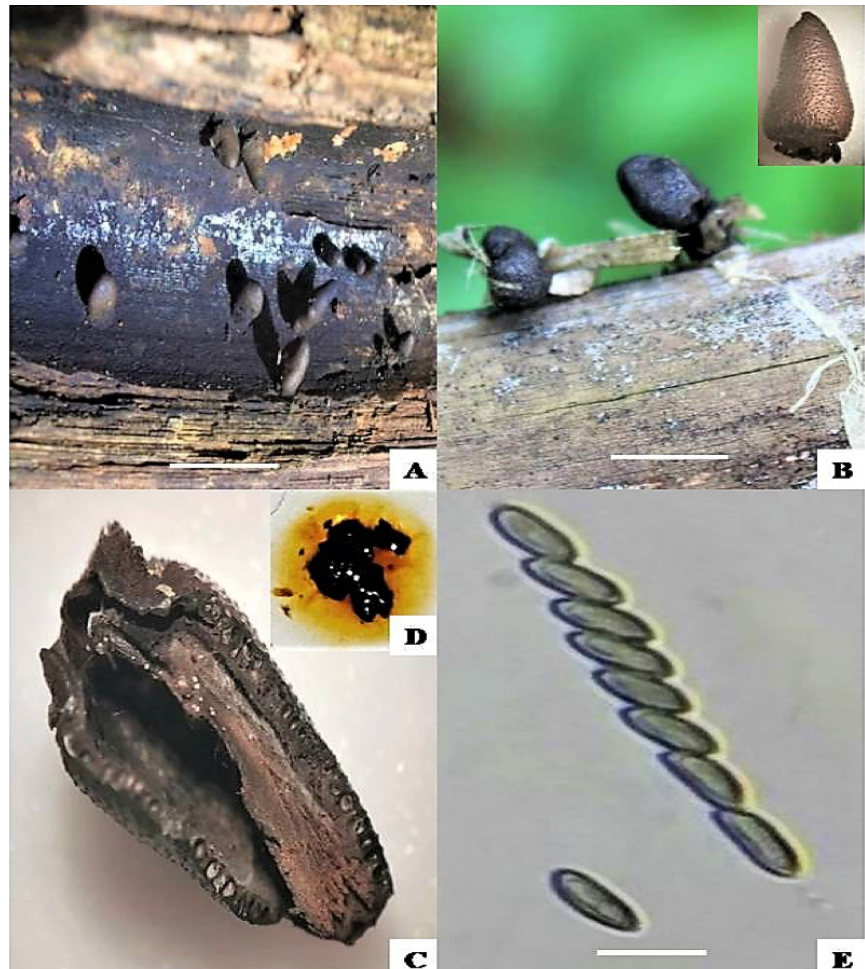


Image 1. A—*Xylaria badia* habitat | B—Stromata enlarged | C—V.S. of stromata | D—KoH pigmentation | E—ascospores. Scale bars: A–B= 0.5–1 cm, E= 8.5–9.5 μ m.

on bamboo culms. Based on morphological and microscopic characters it was identified as *Xylaria badia* Pat. The previous reports of *Xylaria badia* Pat., are from southeastern Asia (Vander 1995; Fournier et al. 2019). Photographs of the fungus are provided. It is first report for Karnataka.

Regular exploration of Xylariaceae was carried out in forest regions of Tharikere taluk, Chikkamagaluru district of Karnataka, India during the month of June to September 2019–20. Microscopic features and measurements were made from slide preparations mounted in water and Melzer's

iodine reagent. The photographs of asci, ascal apical rings, and ascospores were taken by using an Olympus CH20i microscope.

The photographs of stromatal surface were taken with a Magnus microscope and Sony cyber-shot. Examined specimens are

deposited in Department of Botany, Kuvempu University, Shankaraghatta, Shivamogga, Karnataka, India.



Taxonomic description

Xylaria badia Pat., Journal de Botanique, 5(19): 319 (1891)

Mycobank number: 186925 (Image 1 & 2)

Description: Stromata cylindrical to clavate, short, simple with rounded fertile apices, sub sessile to shortly stipitate 0.5–1 cm total height × 0.2–0.6 cm diam. Surface silvery brown and became to grayish-brown with age with KOH- extractable pigment honey-coloured, internally brownish orange. Surface smooth, shining. Perithecia subglobose, 0.2–0.3 mm diam. Ostioles finely papillate, black. Asci cylindrical, shortly stipitate, apical apparatus discoid, blueing in Melzer's reagent. Ascospores 8.5–9.5 µm × 3.5–4.3 µm, light brown, ellipsoid, in equilateral to equilateral with narrowly to broadly rounded ends, unicellular, germ slit less than full spore length epispore smooth.

Habit: Saprobic in nature.

Habitat: Grown on Bamboo culms.

Specimen examined: KUABHS-11 & KUABHS-17, 10.x.2019 and 1.vii.2020, India, Karnataka, Chikkamagaluru, Tharikere

(13.5489°N & 75.8228°E), coll. S. Himani & M. Krishnappa, Gen bank accession number MW965576.

Comments: *Xylaria badia* differs from other bamboo inhabiting *Xylaria* species by its smaller size and KOH extractable pigments (Fournier et al. 2019).

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Compassionate conservation

Wallach et al. (2018) champion the cause of wildlife individuals as the primary focus for action under the framework of compassionate conservation. According to them, compassionate conservation “aims to safeguard Earth’s biological diversity while retaining a commitment to treating individuals with respect and concern for their well-being”. The four key tenets of this approach include: “do no harm; individuals matter; inclusivity; and peaceful coexistence” (Wallach et al. 2018: 1258). A central



Rescued carcass of Hog Deer.

tenet of compassionate conservation is that empathy should form the founding principle for conservation action (Vucetich & Nelson 2013). Vucetich & Nelson (2013) have proposed that in

the context of conservation, “the purpose of a person living a sustainable life would have to be *“to treat others as one would be treated, if one were in their position”*. It is here that empathy plays a crucial role. Indeed, empathy is taken to provide the “objective, empirical knowledge ...about the conditions and capacities of others (to flourish and suffer)” (Vucetich & Nelson 2013). Empathy can be defined as the ability to know/understand the moods/mental state of the others including human beings, animals, and fictional characters. It is a new word in comparison to the word sympathy. Sympathy is the ability to feel the suffering of the others including human beings, animals, birds and



Ranjan Roy, the village boy.



Communication among the local people.

fictional characters. As an expert on 'empathy and emotional intelligence', Mr. Daniel Goldman defines empathy as having three levels: (a) cognitive empathy, (b) emotive empathy, and (c) compassionate empathy. The first level is the cognition/ understanding the mental state of others. The second level is the emotion/feeling of the mental state of others. In the final level someone wish to help others with 'Karuna' (compassion).

One can empathize with the mental state of others, when she/he is able to put her/his feet in the shoes of others. Compassion is there in sympathy also; where someone is able to

feel compassion for others, but can't understand. In simple terms compassionate empathy is a deeper emotion than the compassionate sympathy. One can understand compassionate empathy, but one can feel only the compassionate sympathy. Sympathy is to feel for the others, but empathy starts where otherness disappears.

Empathy is the understanding of both happiness and sufferings. Sympathy is the feeling of sufferings for the others.

Conventionally, every year the territorial staff of all the territorial and wildlife divisions of the Directorate of Forests,

Government of West Bengal conduct anti-poaching duties, area domination, and awareness creation among the tribal and local people during the festival of colour (Holi) to save the wild animals from the malpractice of ritual hunting. But this time during the days of anti-poaching duty as on 28 March 2021 a village boy named Ranjan Roy of Ambari, Block- Coochbehar-II under the PS- Pundibari of the Coochbehar Division, West Bengal showed that the ethos of compassionate conservation towards wildlife are also embedded among the villagers.

Compassionate conservation of local people towards wildlife can be elaborated by

the following field experiences gathered direct from the field. During the field visit to Gir National Park, Gujarat in the year 2013 I had interacted with the local farmers of the fringe areas. To my astonishment, I came to know that local farmers were very happy co-existing with lions in that landscape, although lions hunt the livestock of the local farmers. They explained that they were compelled to night watch to protect their crops from the Blue Bull/Nilgai *Boselaphus tragocamelus* every night during the crop season on a rotation basis by the family members. When they spot lions resting surrounding/in their crop fields, they became tensionless and return home with the satisfaction that Nilgai will not raid their crop.

When asked about the loss of valuable livestock by the lions, they indicated that the average annual individual loss of a farmer was negligible. Because lions prey mainly on Nilgai; in case of loss of livestock local farmers get suitable compensation from the state government. This wonderful embedded ethos of nature-culture linkage of fringe people is supporting the in

situ Asiatic Lion conservation in the Gir National Park, Gujarat.

As on 28 March 2021 at about 10 AM a village boy named Ranjan Roy of Ambari, Coochbehar saw a stray Hog Deer *Axis porcinus* (a Scheduled I wild animal on the Wild Life Protection Act, 1972) was attacked by two feral dogs. The Hog Deer is an endangered animal which is distributed from the alluvial grasslands of the Terai/Dooars forest of Corbett to Jaldapara, Buxa to Kaziranga (Saha 2020).

Study Area: Ambari is a revenue village situated in Coochbehar District. It is totally a non forest area 30 km away from Patlakhawa protected forest. The local

people depend on farming for livelihood. Between Patlakhawa protected forest and Ambari village laid the Torsa River and the rural markets. The soil and water of Ambari village are mostly suitable for vegetables farming. Apart from that people rear domestic cattle and goats for milk and meat, respectively. People of Ambari had seen a Hog Deer for the first time and so were curious.

With utmost urgency the boy rescued the stray Hog Deer, who was injured from dog bite on the back. Though the injury was severe, the animal was alive for a while and the boy tried his best by pouring water in the mouth and on the head of the injured animal. But the effort was not enough



Dog bite injury at the hind portion of the Hog Deer.

to save the animal from death. In the mean time the local crowd gathered in that area surrounding the dead body of the Hog Deer. A few people demanded to slaughter the dead animal for Holi festival. A few others wanted to take different body parts like antlers, hooves, and skin hairs of the dead animal to prepare amulets as superstitious belief of protection from the diseases. Many people gathered for taking images on their mobiles.

However, the boy rescued the carcass from the mob of a 1,000 people and took to his home for safety. Through a messenger the boy informed the field staff of the nearest Pundibari Range under Coochbehar Division. In this way 'hunting' was prevented by that boy because as per Sec 2(16) (c) of the Wildlife Protection Act, 1972 'hunting' with its grammatical variations and cognate expressions includes - injuring or destroying or taking any part of the body of any wild or captive animal (WWF TRAFFIC 2010). The author as Divisional Forest Officer of the territorial Coochbehar Division went to the village along with his field

staff and found that the Hog Deer had strayed from the Patlakhawa protected forest after crossing almost 30 km distance including vegetable fields, Kaljani River, and road to reach the human habitation of a non forest area.

I extended my thanks to that village boy named Ranjan Roy for his commendable job of compassionate conservation towards a Hog Deer after its death also. Then using that platform, an awareness was created among the villagers regarding the fundamental duty of people towards wildlife conservation as per the Constitution of India. We made them understand the definition of 'animal article', 'wild animal', and 'hunting' as per Sec 2, prohibition of hunting as per the Sec 9 and related 'Penalties' as per the Sec 51 of the Wildlife Protection Act, 1972 (WWF TRAFFIC 2010).

People were curious to know why it is called a Hog Deer. We informed them that the deer moves through the forests by head hung low like a hog and ducking under the obstacles rather than jumping to move forward (Menon 2014).

People became more curious about the Hog Deer and regarding its preorbital gland situated in front of the orbit or eye socket of the animal. We have communicated that it is somewhat like our lachrymal gland, but used for the secretion of pheromones or other semiochemicals as a mode of communication with other individuals of Hog Deer (Menon 2014). It is also pleasurable for the animal to rub the glands in the twigs of vegetation. The secretion of the gland on the twigs actually marks the territory and also the scent of the secretions attracts partners for mating (Menon 2014). Preorbital glands also harbour microorganisms and biosynthesized secretions by the microorganisms of this gland may protect the skin also (Menon 2014).

Local people were interested to know the difference between antlers of the deer and horns of the Gaur or domestic cattle. With the following comparison in an easy way it is was communicated them. In this way an endangered wild animal Hog Deer after death also contributed to the people and society.

Antlers	Horns
Single Structured.	Two part structured.
Branched.	Unbranched.
Extension of skull and made up of bone mainly apart from nerves and blood vessels.	Inner part made up of bone and outer sheath covering is mainly made up of keratin protein like human nails and hairs.
Shed Annually.	Permanent structure.
Found mainly in male.	Found both in male and female (in a diminutive form).
Used to show dominance against the competitive male and mainly to attract the female for mating.	Used as a tool at the time of fighting and protection.



The rescuer boy honoured by lady forest guard.

Coochbehar Division also felicitated the village boy for his contribution towards compassionate conservation. Coochbehar Division facilitated whole day field visit of that rescuer boy in the Patlakhawa protected forest under Pundibari Range. The boy communicated that it was an experience of his life time to sight wild animals like Gaur, Spotted Deer, Hog Deer, and Wild Boar in their natural habitat. The rescuer boy took

the pledge to rescue wild animals in future also. The approach of compassionate conservation of that rescuer boy gave a platform for the forest department in creating awareness among the local people of non forest areas regarding role and duties of them towards wildlife protection and conservation; it also helped to remove the superstitious beliefs from the minds of people regarding the illegal usage of the body

parts of wild animals. It will definitely reduce the intensity of hunting.

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