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Cover photo: Spot-bellied Eagle-Owl. © Prabhat Kumar Das.

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

The secret life of freshwater Shrimp *Caridina fernandoi* in Karnataka's subterranean realms

Freshwater habitats account for less than 1% of the Earth's surface but support nearly 10% of the world's species, with invertebrates making up to 85% of this diversity (Strayer & Dudgeon 2010). Among these, freshwater decapod crustaceans, particularly shrimps and crabs are the most diverse (Balian et al. 2008).

Live colouration of *Caridina fernandoi*. © Mahim Bhat.

Freshwater shrimps play a crucial role in tropical and subtropical ecosystems, where many species are harvested for the aquarium trade or cultivated for food. In Western Ghats, only four genera of freshwater shrimps have been identified: *Troglindicus*, *Eurindicus*, *Caridina*, and *Macrobrachium.* The *Caridina* and *Macrobrachium* genera display a wide variety of sizes and colours, contributing significantly to ecological and economic functions, particularly in the processes of macro decomposition through scavenging and shredding debris and leaf litter (Moulton et al. 2010).

Caridina species thrive in various environments, including lowland reservoirs, slow-flowing rivers, and subterranean habitats (Holthuis 1956; Jalihal et al. 1984). Their presence in the Western Ghats emphasizes the need for further exploration of stygobiotic shrimp species in this biodiversity hotspot. Research on *Caridina* species in underground environments in India is limited, due to inadequate exploration of these species (Sankolli & Shenoy 1979; De Grave et al. 2018). As a result, our understanding of their ecological roles remains limited. This study aims to

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Sampled wells: A—well 1 | B—well 2. © Maclean Santos.

investigate whether any *Caridina* species inhabit the subterranean habitats in the central Western Ghats by examining homestead wells, often seen as gateways to subterranean environments. From May 2023 to July 2024, a study was conducted in two homestead wells, well 1- (13.2573 N; 74.8787 E) and well 2 – (13.2553 N 74.8821 E), located in Ninjoor Village, Karkala Taluk, Udupi District. The wells were chosen for their laterite soil, which provides ideal conditions for subterranean species (Raghavan et al. 2021). Constructed over 150–200 years ago and minimally utilized in recent years, these wells were suitable for our study. Sampling primarily involved custom-made minnow traps, and during summer, when water levels dropped, we accessed the wells using ropes and rocky steps. Inside the wells, we attempted to collect specimens using scoop or drag nets, but these methods were largely unsuccessful. Instead, we deployed minnow traps baited with MaOrn pellet feed, leaving them overnight. Success was observed only in traps left overnight, indicating nocturnal behavior typical of crustaceans and a strategy to avoid predators.

The traps were deployed over 50 times, and we accessed the wells five times during the study. Despite extensive efforts, only five specimens

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(male and female) were collected, highlighting the challenges of sampling in such habitats. Interestingly, a small stream adjacent to the wells carried water only during the monsoon season. During this time, numerous juveniles of the *Caridina* species were found in the stream, and a few adults were observed.

A notable concentration of juveniles near both the wells, indicates a possible underground connection between the wells and the stream. Given that *Caridina* species typically have free-floating larval stages, it is plausible that larvae are flushed into the stream from the wells. This was further supported by the collection of berried specimens from the well.

The species was identified as *Caridina fernandoi*, using primary literature (Arudpragasam & Costa 1962) which is known from Karnataka, Kerala, and Telangana across various habitats, including rivers and streams. This study represents the first record of *C. fernandoi* inhabiting well environments. The species exhibits robust morphology and strong legs, enabling it to walk on land and climb obstacles, which may explain its presence in

Stream during different seasons: C—during summer | D—during monsoon. © Maclean Santos.

A specimen captured using minnow traps (deceased). © Maclean Santos.

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Custom-made minnow traps. © Maclean Santos.

well environments. Initially, we considered the possibility that the shrimps originated from nearby permanent water bodies during monsoon overflows, but this was dismissed due to the absence of such water bodies near the study site. The collection of berried females indicates that the species is successfully thriving and breeding in well environments. *C. fernandoi* is highly adaptable, having been found in polluted sewage water in the Mangaluru region (Maclean Antony Santos pers. obs.). The beautiful colouration and hardy nature make this shrimp have high ornamental potential if introduced to the aquarium trade.

Reports of similar accidental discoveries in other regions of the Western Ghats reinforce the idea that many more surface-dwelling or stygobiotic shrimp species may inhabit these environments. Often, these species are overlooked, discarded, or added to home aquariums. Although some images shared in the social media posts suggest these species might be *C. fernandoi*, coloration and morphological characteristics in *Caridina* are too plastic for reliable identification, (Mazancourt et al. 2017) particularly for specimens from well habitats.

Discoveries of these species often rely on chance, and traditional sampling methods may not effectively capture them. Local enthusiasts are more likely to encounter these species, as evidenced by recent subterranean fish discoveries in Kerala (Britz et al. 2019). We also anticipate more fascinating insights into freshwater shrimps in the future.

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Some observations on the life cycle of the Great Eggfly *Hypolimnas bolina* Linnaeus 1758

Butterflies are a widely recognized group of insects, admired for their beauty and vibrant colours, making them popular among nature enthusiasts. They are highly sensitive to environmental factors such as temperature, humidity, rainfall, and the availability of larval host plants (Ribeiro & Freitas 2012).

Due to their dependence on specific plants for food and sheltering throughout their life cycle, butterflies are often used as indicators of habitat disturbance and environmental change (Kunte 1997; Padhye et al. 2006). Their abundance is a sign of a thriving ecosystem, as they play a crucial role in the food chain as both predators and prey (Blair 1999; Mennechez et al. 2003). Additionally, butterflies are considered umbrella species in

Host plant *Sapindus mukorossi* and Great Eggfly caterpillar.

Caterpillar.

Caterpillar character: Dark brown in colour and orange colour head.

Pupa.

Adult emerged from the pupa.

Adult released into natural environment.

Great Eggfly life cycle – caterpillar to adult. © Arockianathan Samson.

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Host plant *Sapindus mukorossi*. © Arockianathan Samson.

conservation planning, where their protection can also safeguard other species within the same habitat (Betrus et al. 2005).

In this study, we observed the life cycle of the Great Eggfly *Hypolimnas bolina* Linnaeus, 1758, from caterpillar to adult stages, as well as its host plants in Bhopal, Madhya Pradesh, India. This species is widely distributed across southeast Asia (Clarke & Sheppard 1975) and its behaviour offers insights into habitat-specific interactions and ecological health.

On 28 August 2024, we observed a caterpillar feeding on *Sapindus mukorossi* (commonly known as Reetha). Due to heavy rainfall, we collected the caterpillar and placed it in a plastic container with leaves and sticks to create a safe environment for further development. By 29 August 2024, the caterpillar had formed a pupa, and on 4 September 2024 at 1030 h, an adult Great Eggfly emerged. We released the butterfly into the natural environment.

While this study has some limitations, such as missing the egg and caterpillar stages, it provides valuable insights into the host plant, identification of the Great Eggfly's caterpillar and pupa structure, and the metamorphosis period from pupa to adult (6 days). This observation offers a foundation for future studies on the life cycle of the Great Eggfly.

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Short note on the occurrence of the African Giant Snail in Chennai, Tamil Nadu

Lissachatina fulica Bowdich commonly known as the Giant African Snail (GAS) is a global invasive predator native to the eastern coast of Africa. In India, GAS was initially introduced in Calcutta by a renowned malacologist W.H. Benson in 1847 (Srivastava 1992). Since then, the species has spread widely and has been reported across several southern states of India, including Kerala, Tamil Nadu, and Karnataka. In Tamil Nadu, *L. fulica* has been observed in multiple districts, such as Chennai, Chidambaram, Coimbatore, and Chengalpattu (Raut & Ghose 1984). The GAS being a generalist species consumes over 500 plant species and has consistently been listed among the '100 Worst Alien Invasive Species' (Lowe et al. 2000; Invasive Species Specialist Group 2012). This emphasizes the need for documenting the spread of *L. fulica* and assessing its ecological impacts. Such efforts are particularly critical in regions like Chennai District, where detailed records remain sparse since the initial observation by Raut & Ghose (1984).

***Lissachatina fulica* observed in Chennai. © Phillmon Smart Edward.**

The distribution records of *L. fulica* were collected during

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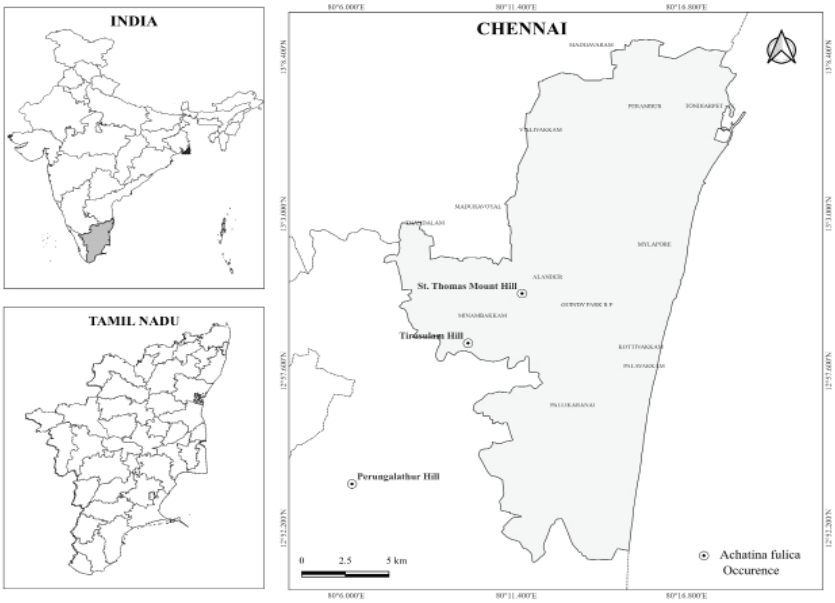

GPS points of the distribution records of *Lissachatina fulica* in Chennai, Tamil Nadu, India.

opportunistic sampling conducted from September to November 2024 in Chennai District, Tamil Nadu. Field surveys were carried out across various urban and semi-urban locations, based on accessibility and visual confirmation of the species. GPS coordinates of the observed individuals were recorded using a handheld GPS device with an accuracy of ±3 meters. Populations of *L. fulica* were confirmed at three key locations: St. Thomas Mount (13.0047 N, 80.1931 E), Tirusulam (12.976209 N, 80.164528 E), and Perungalathur Hills (12.895543 N, 80.103184 E). These areas, characterized by moderate vegetation and varying degrees of human activity, highlight the presence and adaptability of this invasive species within the district.

This invasive gastropod serves as an intermediate host for several parasitic nematodes, including zoonotic species such as *Angiostrongylus cantonensis* and *A. costaricensis*, which cause eosinophilic meningoencephalitis and abdominal angiostrongyliasis, respectively (Alicata 1991; Cowie 2013). These infections, often transmitted through ingestion of contaminated gastropods or their residues, pose significant public health risks in regions where the snail has established populations (Graeff-Teixeira et al. 2009).

Chennai, a densely populated metropolitan city in Tamil Nadu, faces significant risks from the presence of *L. fulica*, a vector for zoonotic diseases like *eosinophilic meningoencephalitis*, which poses serious public health concerns (Cowie 2013). The city's susceptibility to flooding during the monsoon season (Radhakrishnan et al. 2024) further exacerbates the spread of infections, as floodwaters disperse snails and contaminate resources. This risk is heightened during the rainy winter months when snails emerge from hibernation (Schweizer et al. 2019). Therefore, these factors emphasize the urgent need for a comprehensive population survey of *L. fulica* in Chennai.

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This should be followed by effective monitoring and management strategies to mitigate the associated health and ecological threats.

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First photographic evidence of nesting of Asian Brown Flycatcher in Dehradun, Uttarakhand, India

The Asian Brown Flycatcher *Muscicapa dauurica* is a summer and winter visitor to the Himalayan foothills and hills of central and western India. During winter, it is also found in central, southern, and eastern India as well as in Sri Lanka (Ali & Ripley 1983; Grimmett et al. 2011). It breeds in temperate habitats in east Asia and Mongolia as well as sporadically in southern Asia. Most of the northern populations of the species migrate south in southern Asia and southern India. Potentially, populations that breed in southern Asia will move even further south, to southern India (Santharam 2003).

Asian Brown Flycatcher, Sal Patch, Dehradun. © G. Gokulakrishnan.

On 29 April 2023, a nesting pair of Asian Brown Flycatcher was observed in Sal Patch near Wildlife Institute of India, Dehradun at exactly 30.28 N, 77.91 E in location. The nest was observed on Teak *Tectona grandis* tree from 6 m above ground level. It was in the middle of the branch shaded with a dry leaf. The nesting tree is next to a trail, and the habitat is sal forest; a dry riverbed is only 10 m away. Rosy Minivet *Pericrocotus roseus*, Bar-winged Flycatcher-shrike *Hemipus picatus*, and Common Woodshrike *Tephrodornis pondicerianus* are also seen in the vicinity of 5 m. During the observation, both parents were building nests and collecting nesting material. The nesting of this species has been recorded in Uttarakhand, Madhya Pradesh, Karnataka, Kerala, Rajasthan, Tamil Nadu, Andhra Pradesh, Telangana, Gujarat, Maharashtra, Goa, Haryana, and Delhi earlier (Ali & Ripley1983; Mohan & Kumar 2010; Mohan & Muralidhar 2019). Ours is the first photographic record of nesting of the species in Dehradun and more information can be gathered by avian enthusiasts through careful observation.

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Unprecedented avian encounter: hybrid of Northern Shoveler and Australian Shoveler discovered in Gajaldoba, West Bengal, India

This research article presents the second photographic documentation of the hybrid of Northern Shoveler *Spatula clypeata* and Australian Shoveler *Spatula rhynchotis* within the environs of Gajaldoba, Testa Barrage, West Bengal, India, noted on the morning of 08 February 2024. Gajaldoba Barrage, positioned at coordinates 26.754 N, 88.590 E, stands as a prominent habitat for waterfowl. The Gajaldoba Birding site encompasses two distinct sectors: the primary river barrage and a smaller marshland situated on the opposing bank. The observation of the hybrid Australian Shoveler occurred within the marshland segment of the barrage, characterized by vegetative cover along the river's edge and the presence of stagnant water.

The Australian Shoveler, a member of the Anatidae family, is indigenous to Australia and New Zealand

Hybrid of Northern Shoveler *Spatula clypeata* and Australian Shoveler *Spatula rhynchotis* record from Gajaldoba, West Bengal, India. © Dorjee Bachung.

(Fullagar 2010; del Hoyo & Collar 2014). This species exhibits sexual dimorphism, notably characterized by the male's vivid plumage throughout most of the year. Distinguished by a blue-grey head and neck, complemented by a distinct white crescent band at the base of its prominent black spatulate bill, the male Shoveler stands out. Its breast displays a mottled pattern of brown and white, transitioning to a pure white hue during the nuptial moult in May (Caithness et al. 2002).

The observation of the hybrid of Northern Shoveler and Australian Shoveler in Gajaldoba was recorded on 08 February 2024, by the first author during routine avian surveys in the area. The hybrid of Northern and Australian Shoveler was identified by its white facial crescent mark which is clearly visible in this duck, a feature not present in the Northern Shoveler. The expert ornithologist, Dr. Asad Rahmani, identified this species and suggested it could be a hybrid of the Australian Shoveler. Detailed field notes

were meticulously compiled, encompassing aspects such as location, habitat characteristics, behaviour, and any accompanying avian species. The inclusion of this duck species enriches the diverse avifauna of the region, renowned for its abundant biodiversity and distinctive ecosystems. Notably, Vishwakarma et al. (2022) previously documented the hybrid between the Australian and Northern Shoveler at Pobitara Wildlife Sanctuary, Assam, during the same time period, indicating their presence since 2021.

The sighting of the hybrid Australian Shoveler in Gajaldoba raises questions regarding its migratory routes and potential habitat preferences outside its known range. Further research is warranted to explore the factors influencing the presence of the species in new areas and its interactions with local ecosystems. The documented record of the hybrid Australian Shoveler in Gajaldoba underscores the importance of ongoing monitoring and conservation efforts to protect avian biodiversity. Continued research and observation are essential for understanding the dynamics of migratory bird species and ensuring their long-term survival. The sighting adds to the avian biodiversity of the region and underscores the importance of continued monitoring and conservation efforts. Detailed observations of the habitat and behaviour of the hybrid Australian Shoveler are presented, along with implications for further research and conservation initiatives.

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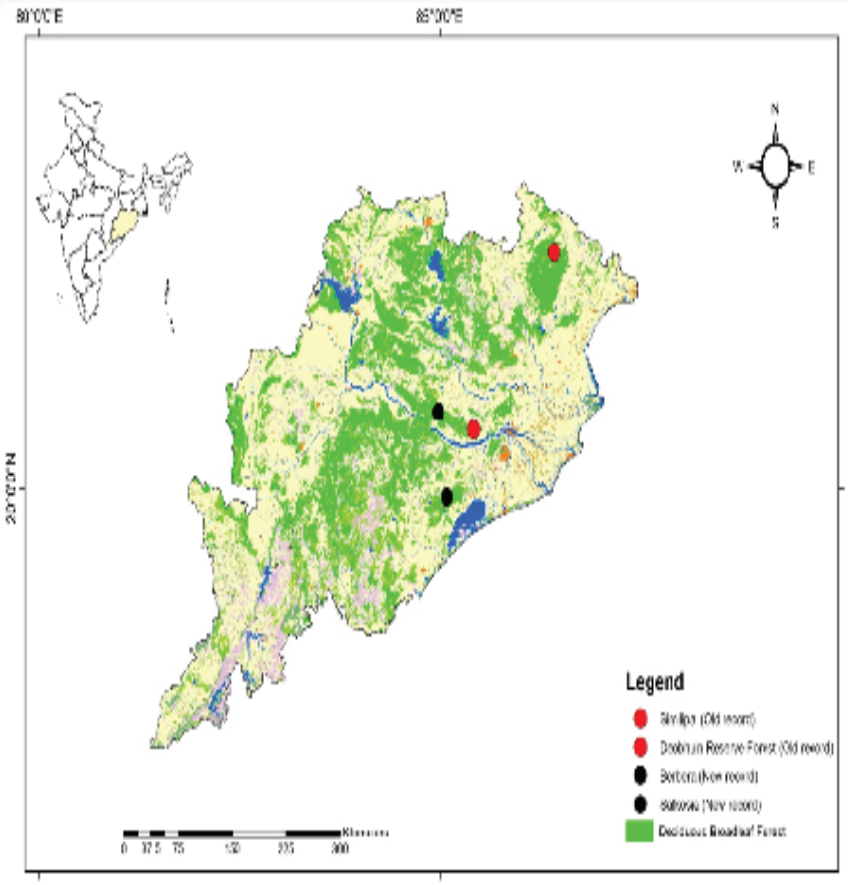
Further records and update of range extension of Spot-bellied Eagle-Owl in Odisha, India

Around 275 species of owl have been recorded worldwide (Mikkola 2012), with 12 species belonging to the genus *Ketupa*, of which five are found in India: *Ketupa zeylonensis*, *Ketupa flavipes*, *Ketupa ketupu*, *Ketupa coromanda*, and *Ketupa nipalensis*. In Odisha, two species are present, namely *Ketupa zeylonensis* and *Ketupa nipalensis* (Gill et al. 2024). *Ketupa nipalensis*, is considered a rare species in Odisha and is classified as 'Least Concern' on the IUCN Red List (BirdLife International 2018) and is listed under Schedule I in the Wildlife (Protection) Amendment Act, 2022.

The Spot-bellied Eagle-Owl, a formidable raptor, inhabits various regions of southeastern Asia including the Indian subcontinent. Its range extends through sub-montane areas and the lower Himalaya, typically up to approximately 2,100 m. It mostly inhabits in the evergreen and moist deciduous forests and it prefers riparian

Spot-bellied Eagle-Owl recorded in Tamana Reserve Forest (Top) and Satkosia Tiger Reserve (Bottom), Odisha. © Prabhat Kumar Das & Anil Kumar Jena.



New observations of *Ketupa nipalensis* in Odisha, India.

gallery forests, montane wet temperate forests, and moist deciduous forests. This owl is considered as a resident species, though its sightings are sparse in different parts of India (Jayapal et al. 2005; Deshmukh 2008; Majumder et al. 2011) and reported from Madhya Pradesh (Choudhury 2001), Nagaland (Sharma et al. 2020), Uttarakhand (Whistler & Kinnear 1936), and Andhra Pradesh (Srinivasan 2013).

This species has been documented in Odisha only from two localities such as Deobhuin Reserve Forest in Athagarh Forest Division (Palei et al. 2018) and the Similipal Tiger Reserve (Nayak & Naik 2014). Despite subsequent avifaunal surveys, there have been no further reports of its occurrence in the state of Odisha.

During the inventory and assessment of biodiversity conducted in various biologically rich sites across Odisha from 2019 to 2022, two different individuals of Spot-bellied Eagle-Owls were observed in two new and separate locations. These owls were identified by their distinctive features, including their large size, prominent black-and-white horizontal ear-tufts, large yellow beaks, fully feathered tarsi, and notable V-shaped black markings on their underparts. An individual of this species was observed at Satkosia Tiger Reserve, Odisha (20.6392 N, 84.9871 E) on 13 July 2020 at 1818 h, perched on a *Shorea robusta* tree and another sighting occurred on 26 October 2021 at Tamana Reserve Forest, Odisha (19.9256 N, 85.1046 E) at 1701 h, where the owl was roosting on a *Terminalia bellirica* tree. Both Satkosia Tiger Reserve and Tamana Reserve Forest are characterized by similar habitat types, specifically moist riverine forests.

The recent sightings and observations of the Spot-bellied Eagle-Owl *Ketupa nipalensis* in two more new localities of Odisha marked a significant observation within the state. The extension of its range further south not only enhances our understanding of the species habitat preferences

but also underscores the importance of continued monitoring and conservation efforts. As additional data is collected, it is anticipated that further populations of this owl species will be identified, underscoring the necessity for the development of revised conservation strategies to safeguard its increasingly diverse and expanding habitats in Odisha.

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Merlin seen after several years in Punjab, India

While watching birds at Harike Wildlife Sanctuary (31.1504 N, 74.9513 E, 210 m), Punjab, India, the second author saw a raptor at about 1245 h on 21 January 2023. The bird was suspected to be a Merlin *Falco columbarius* but the photos were not very good as the bird was quiet far away. The pictures were posted on a Facebook group, Ask IDs of Indian Birds. As suspected, the identity was confirmed as Merlin. On the day that this individual was observed, we spent another two hours bird watching, but we did not see it again. Later on, during a discussion between the present authors, it was discovered that Merlin was seen after several years in Punjab, India.

The Merlin at Harike. © Paramnoor Singh Antaal.

Another view of the Merlin at Harike. © Paramnoor Singh Antaal.

Merlin is considered to be a rare/scarce winter visitor to Punjab (Naoroji 2006; Rasmussen & Anderton 2012). The oldest published record from Punjab, India, that we found is that of a specimen from Hoshiarpur (Hume 1869). In the same account by him, it is also mentioned: "About Amritsar it is commonly captured and sold, by native huntsmen, for a very small price". Merlin has also been recorded in Kapurthala (Phillott 1907). Robson (1994) has reported single Merlin sighting from Harike Wildlife Sanctuary. After this, there is no published record from Punjab to the best of the authors' knowledge. We checked the bibliography of South Asia Ornithology

(Pittie 2024) for published records of Merlin from Punjab but did not find any, except the ones already mentioned above. We also checked social media forums like Facebook and Instagram and citizen science platforms like eBird and iNaturalist, but did not find any reporting of Merlin from Punjab. Therefore, after carefully checking all the records/sources, we did not find any sighting of Merlin from Punjab State since 1994.

However, in the last more than a decade, a few sightings nearest to the present location have been from the Pong Lake area in Himachal Pradesh (Abhinav & Vikrant 2020; eBird 2024). This location is at an aerial distance of about 125 km to the north-east of Harike Wildlife Sanctuary. Incidentally, both the locations are connected with Beas River.

Therefore, after about twenty years of the last published record, the present observation reaffirms the status of Merlin as a winter visitor to Punjab, India. Harike Wildlife Sanctuary is a Ramsar Site of international importance as maximum bird species in Punjab have been seen at this location. The present sighting underlines the importance of this wildlife sanctuary for bird conservation because it continues to provide suitable habitat for raptors like the Merlin (and other resident and migratory birds also).

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Prolonged anaesthetic and surgical management of Asiatic Lion for lumbo-abdominal infighting injuries

Chaudhary Surender Singh Memorial Zoo, Bhiwani, Haryana is presently housing three males (one adult and two cubs) and one female Asiatic Lion (*Panthera leo persica*). Infighting during mating among carnivores is mostly due to non-cooperation by the mating partner. However, Asiatic Lions are relatively said to be tolerant due to their social structure. But there are reports of infighting among mating partners in few cases. Mating among carnivores in zoological parks always remains a challenging task for veterinarians and zoo management (Singh et al. 2022). A female aged around three years during mating sustained infighting injuries in the rump region, posterior thigh region, and lumber region reaching up to lateral abdominal flank area. Visible symptoms included profuse bleeding, shock and bradypnea.

Supplemental oxygen to control decreased oxygen level of lioness. © Ashok Khasa.

Anaesthetic management

Estimated body weight of lioness was 125 kg.

Induction of anaesthesia

Injection Xylazine (Concentration 100 mg/ml) 150 mg IM (intramuscular) and injection Ketamine (concentration 100 mg/ml) 350 mg IM was given by remote drug delivery systems, i.e., by using a blow pipe from 3 m distance.

Induction time

After 15 minutes lioness was recumbent but was showing ear movements when touched by a long bamboo gently. Therefore, a top up dose was also given after 15 minutes of first dose which included injection Xylazine 25 mg IM and injection Ketamine 50 mg IM. Thus, full induction of anaesthesia was achieved after five minutes of top-up dose or twenty minutes [15 minutes (after first dose) + 5 minutes (after top-up dose) = 20 minutes total] after giving first dose of drug combination.

Maintenance of anaesthesia

On any response from animal during the procedure injection Ketamine was given 100 mg twice IV (intravenously) through intravenous catheter

in tail vein. But at the last stage of the procedure, the injection Ketamine 100 mg was given intramuscularly due to the catheter slipping out of the vein.

Thus, total dose during procedure was found to be injection Xylazine 175 mg and injection Ketamine 700 mg.

Surgical procedure

Wounds were instilled with injection Ethamsylate to prevent bleeding. Once the bleeding was checked the wounds were cleaned with normal saline solution followed by Povidone Iodine solution. All the underlying tissues and skin were sutured using vicryl suture material. Total time of procedure was approximately two hours.

Complications

The animal exhibited some complications such as very shallow breathing, mild hyperthermia which was initially 102.8 °F but was reduced to 99 °F after temperature management. However, all other parameters remained within acceptable range.

Treatment

Supplemental oxygen was given to control the decreased oxygen level. Cold gel packs were put on thigh and shoulder regions and ethyl alcohol was sprayed on body surface to bring down body temperature.

Medications

- Injection Amoxicillin plus Sulbactum 4.5 g IM was followed by 3 g bolus daily orally in meat.
- Injection Ranitidine 3 ml (25 mg/ml) IM
- Injection Atropine Sulfate 6 ml (0.6 mg/ml) IM
- Injection Meloxicam 5 ml (5 mg/ml) IM followed by oral bolus in meat
- Injection Chlorpheniramine Maleate 6 ml (10 mg/ml) IM
- Injection Multivitamin 5 ml IM followed by orally in drinking water
- Injection Ivermectin 3 ml (1%) SC (Subcutaneous)
- Injection DNS 500 ml IV
- Injection Vitamin-C 3 ml (500 mg/ml) IM

Reversal of anaesthesia and recovery

After surgical procedure, the lioness was revived by using reversal agent injection Yohimbine 2 ml (10 mg per ml) IM. Total recovery time was around two hours. Overall recovery was smooth and eventless.

Result and Discussion

Wounds of the lioness healed after 45 days. She again showed estrous after six months and 15 days and successful mating with same male was on 20 February 2024. Cubs were delivered on 05 June 2024.

Induction dose was found to be 1.4 mg/kg for injection Xylazine and 3.2 mg/kg for injection Ketamine. Whereas, maintenance dose was 0.8 mg/kg for injection Ketamine. Several anaesthetic protocols have been described by the different authors (Sontakke et al. 2017), but in India, injection Xylazine and injection Ketamine are very easily available drugs, therefore in this case both drugs were used successfully. Our drug combination and doses also somewhat correspond with the doses prescribed by the SOP, Etawah Safari Park and Singh et al. (2024). Post-surgical management of wounds among wild carnivores is one of the

toughest parts for a veterinarian. In this case the lioness was continuously observed and was kept in a small cage in order to prevent biting of sutures.

Another challenging task was to prevent antimicrobial resistance, which was achieved by local application of antimicrobial and fly repellent thrice daily, which proved very fruitful in controlling settlement of infection on the wound and reduced oral or parenteral use of antimicrobials. Our study equates with that of Yadav et al. (2024) who in a study described that most of the samples from Asiatic Lions were found to be resistant against commonly used antibiotics. The lioness completely recovered after 45 days and again mated successfully with the same male.

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INTO THE WILD AND BEYOND: A JOURNEY OF CONSERVATION, EXPLORATION, AND STARGAZING IN KODAIKANAL

Mango Education, with a vision to build an ecosystem that contributes to scientific curiosity and technological exploration among students, organized a 3-day Kodaikanal expedition for grade 9 students of Yellow Train School, Coimbatore.
In collaboration with Zoo Outreach Organisation, where I am currently interning, I joined the expedition to educate students about wildlife conservation and environmental awareness. Our journey began early in the morning of 10 March 2025, at 5 from Coimbatore.

The students arrived on a bus arranged by their school, and we met for breakfast, where we introduced ourselves before continuing on our journey. Our first stop was the Shembaganur Museum of Natural History at Kodaikanal, where I conducted a session on wildlife conservation, specimen preservation techniques, evolution and migration, and the behaviour and morphology of birds, butterflies, and moths.


© Obuli Chandran.


© Koshik Rao.


© Vignesh.

planets, galaxies, nebulae, clusters, and celestial events with remarkable clarity, thanks to the pristine night sky. The session fascinated both the students and me, deepening our appreciation for astronomy.

Later, we travelled to Woodstock Farm in Kookal village, known for its breathtaking night skies, ideal for stargazing. In the evening, I organized interactive activities for the students, including an observation game to enhance their attention to detail—an essential skill in conservation and other aspects of life. I also encouraged them to create imaginary animals by combining features of the species they had observed at the museum, reinforcing their memory and creativity. These activities were inspired by my experience in the Ram Hattikudur Advanced Training in Conservation (RHATC) course. I strongly believe that combining science and conservation-based games helps students develop both curiosity and a sense of responsibility toward the environment. Hopefully, these experiences will shape them into future conservationists who strive for ecological balance, where humans, wildlife, and sustainable development coexist harmoniously.

In the evening, Obuli Chandran of Mango Education and his colleague Vignesh conducted an engaging stargazing session. Using telescopes, we observed stars,

The next morning, the weather had completely transformed—freezing cold, drizzling rain, and strong winds. Despite this, both the students and the team were eager for an adventure. We geared up in raincoats and jackets and embarked on a nature trek through patches of Western Ghats forests and grasslands. Along the way, I explained the impact of invasive plant species—one of the major challenges in conservation and human-wildlife interactions. We also discussed wild animal behaviour and the negative consequences of feeding them, which can lead to habituation and negative interactions with

a fun and thought-provoking way. That night, due to the rain, we had no electricity in the village, but this only brought us closer as we shared stories and enjoyed each other's company.

Early the next morning, at around 4, the skies cleared, revealing a spectacular view. Obuli and Vignesh quickly set up the telescope, allowing us to observe celestial objects. To our delight, we could even see the Milky Way galaxy with the naked eye—a breathtaking sight that left everyone in awe. Despite the bitter cold and strong winds, the students' enthusiasm for space and astronomy was unwavering.

humans. The trek concluded at a beautiful waterfall nestled amidst village farmlands, where we took a moment to admire the scenery before heading back to the camp.

When in the field, adapting the education program based on the weather keeps things exciting even for the trainers. As it was cold and constantly raining we modified our education plan. Obuli led an engaging session with tasks related to the moon, spaceships, and ranking the survival priorities of astronomers until they reach their mothership. The challenge sparked curiosity among the students, encouraging them to apply their knowledge of space science in

After this unforgettable experience, we set off for our next destination—the Kodaikanal Solar Observatory, India's oldest observatory dedicated to solar research. There, we explored their remarkable achievements and gained insight into the vast and ongoing studies of space and celestial phenomena.

As the expedition came to an end, we bid farewell to the students and returned to Coimbatore. Although this was my first independent experience educating students, it was a deeply enriching one, teaching me valuable lessons about communication, engagement, and conservation education. This journey will remain one of my most cherished memories, as it not only broadened my understanding but also helped me grow into a better version of myself in the field of wildlife conservation.

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Community-based conservation of the globally threatened Great Knot in Bangladesh

Bangladesh is home to key non-breeding sites for thousands of migratory birds, as it lies at the intersection of two major migratory flyways: the Central Asian Flyway and the East Asia-Australasian Flyway (Das et al. 2022). The intertidal mudflats of Bangladesh attract thousands of non-breeding shorebirds each winter, including 19 species of international conservation concern, such as the Great Knot *Calidris tenuirostris*.

Discussing the importance of conserving Great Knot and their habitats. © Naim Khandakar.

The Great Knot is endemic to the East Asia-Australasian Flyway (EAAF) (Tomkovich 1997). Intertidal mudflats of Bangladesh are important non-breeding grounds for this species. Following dramatic population declines, the species has been listed as globally 'Endangered' by the IUCN Red List (BirdLife International 2019) and is protected under Schedule I of the Bangladesh Wildlife (Conservation and Security) Act, 2012 (Khandakar & Jeny 2020).

In an effort to raise awareness about the conservation of the Great Knot, five community outreach and education programmes were conducted along the central coast of Bangladesh from October 2023 to March

Students participating in a community sensitization program by drawing illustrations of the Great Knot. © Naim Khandakar.

Students drew and showcased their artwork on the Great Knot, highlighting their understanding and appreciation of the species and its conservation. © Naim Khandakar.

2024. These programmes marked for the first time a community-based approach which was used to promote the conservation of the Great Knot in Bangladesh.

Engaging the local community by distributing flyers underscoring the significance of conserving Great Knot and their habitats. © Naim Khandakar.

The key objectives of these initiatives were to enhance local awareness about the importance of conserving the Great Knot and its habitats. The programmes engaged a wide range of stakeholders, including fishermen, farmers, school children, teachers and other members of the local community. Educational materials were distributed to reinforce the conservation message, highlighting the need to protect both the Great Knot and other migratory shorebirds.

A documentary video on the Great Knot and other migratory shorebirds of Bangladesh was shown to the participants. © Naim Khandakar.

Empowering school students through training sessions on species identification and the effective use of binoculars. © Naim Khandakar.

The central component of the awareness campaign was engaging school students. Through interactive discussions, students learnt about the ecological significance of the Great Knot and the critical role its habitat plays in supporting biodiversity. To encourage artistic expression, students participated in an art competition where they created drawings of the Great Knot and its habitat. This creative activity helped deepen their understanding and connection to the species, while winners were rewarded for their contributions, reinforcing the value of community engagement in conservation.

Additionally, students were empowered through hands-on training sessions on species identification and the use of binoculars. These skills will help the next generation of conservationists to continue protecting the Great Knot and other species in the future.

Overall, these community-based outreach efforts have contributed to building local capacity for the conservation of the endangered Great Knot on the central coast of Bangladesh, fostering greater awareness and encouraging community participation in protecting this globally important species.

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A group photo with the participants was taken after completing the awareness programme. © Naim Khandakar.

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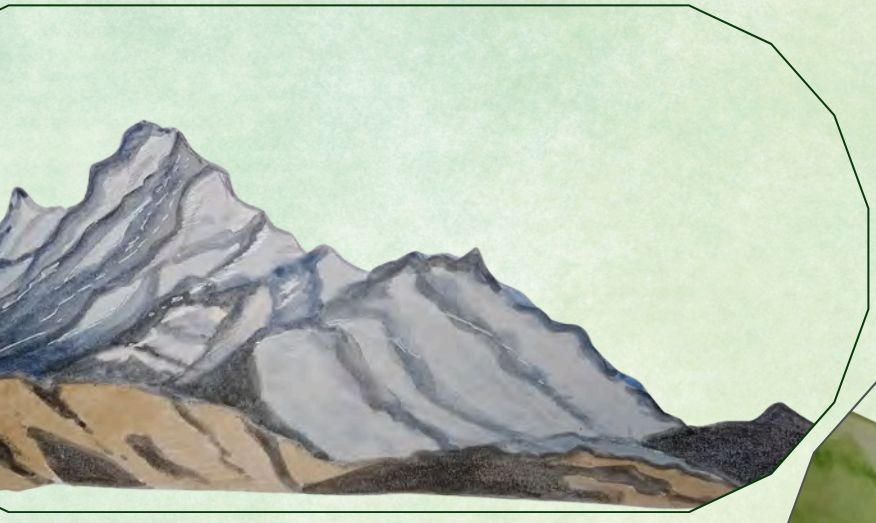

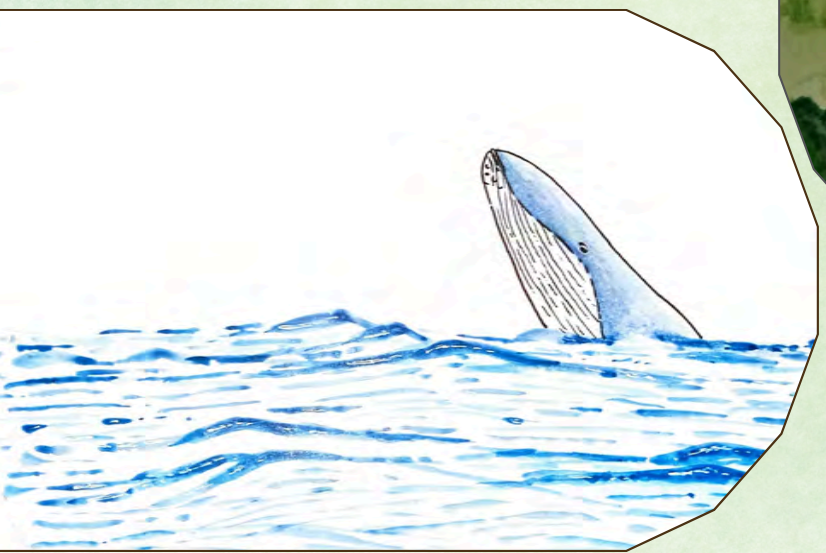

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