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Contents

Cover photo of Black Francolin *Francolinus francolinus* by Partap Singh Kataria.

Chiroptera Conservation and Information Network of South Asia

BATS DON'T CAUSE OR SPREAD COVID-19

The unfounded fear of bats stems from the initial news surrounding the COVID-19 outbreak where bats have been portrayed as a potential source of coronavirus (SARS-CoV-2) that has infected human beings (Wu et al. 2020; Zhou et al. 2020). Bats are the victims of misinformation; they provide greater benefits to the ecosystem and humanity than harm (Molur et al. 2002).

All forms of media are flooded with disconcerting news about the culling of bats in different parts of the world in an attempt to prevent the spread of the novel coronavirus disease (COVID-19). Members of the society, various communities, and governmental authorities are concerned about the possible link between COVID-19 and bats, and are raising many queries to authorities regarding the same.

Conservation scientists and bat biologists have taken up the responsibility to dispel myths and create awareness about how wrong and unscientific it is to blame bats for COVID-19 outbreak and its spread. Undoubtedly, the spread of the COVID-19 pandemic needs to be checked, and it can be, only by breaking the chain of human-to-human transmission (Chan et al. 2020; Liu et al. 2020). It is crucial to have a long-term plan to curtail the outbreak of such diseases by stopping certain human practices, the consumption of wild animals, and the widespread destruction of natural habitats ensuring prevention of such terrible events in the future.

The recent reporting of the discovery of the Bat Coronavirus (BatCoV) in two species of fruit bats in India from Kerala, Tamil Nadu, Puducherry, and Himachal Pradesh (Yadav et al. 2020), and one species of fruit bat from Sri Lanka (Kudagammana et al. 2018) has added to the panic. These scientific findings are the outcome of the virus surveillance studies that help us understand the distribution of potential zoonotic viruses in wild animals. The crossing over of the virus species from animals to humans is through a process of mutation within the virus that makes them adapted to humans. This process is relatively uncommon and far between.

Following numerous enquiries on the subject concerned and the unprecedented increase in the ill will against bats, we share some facts regarding bats and COVID-19 to mitigate the harm to bats.

- **Bats do not spread COVID-19; it is being transmitted from humans to other humans.**
[*SARS-CoV-2 virus strain of SARS-CoV species is very different from BatCoV species found in bats* (Chan et al. 2020; Forster et al. 2020).].

- **There is no evidence that bats directly infected humans with COVID-19 in the first place.**
[*Although, the SARS-CoV-2 is genetically related to the BatCoVs, and belong to the same genus Betacoronavirus, they are different* (Zhang et al. 2020a). *The genetic similarity between BatCov and SARS-CoV-2 ranges only 80–96%* (Hu et al. 2018). *For a better perspective, humans and chimpanzees are 98% similar genetically*.].

- **Scientific investigations are pointing to a chain of events that may have involved bats but most likely only through an intermediate animal.**
[*SARS-CoV-2 is closely related to BatCoV and Pangolin-CoV (80–96% and 91% similarity), initial*

studies on the receptor-binding domain points that the pangolin-CoV has greater pathogenic potential (Kristian et al. 2020; Zhang et al. 2020b).].

Here are some interesting facts about bats

• There are 1,401 bat species in the world (Wilson & Mittermeier 2019) of which 142 species occur in South Asia and 128 species occur in India (Srinivasulu et al. 2020).

• Many of these bat species have adapted to urban environments, living in gardens, urban parks, and even roosting around our homes, without posing a threat to their human neighbours (Voigt & Kingston 2016).
[*Around 75% of the bat species diversity is known from human-dominated or human-influenced landscapes*.].

• Bats and human beings have coexisted for hundreds of thousands of years.

• Bats provide enormous benefits including pollination, seed dispersal, and pest control (Boyles et al. 2011; Kunz et al. 2011; Maas et al. 2015) worth billions of dollars annually.

• Many bat species are in trouble and need our help to survive.
[*Threats to bats include direct persecution, change in quality and quantity of habitats, pollution, the decline in food resources, excessive use of pesticides and pest control activities*.].

• Two bat species are protected by the Indian Wildlife (Protection) Act.
[*Salim Ali's Fruit Bat, a southern Western Ghats endemic species occurring in Kerala and Tamil Nadu, and Wroughton's Free-tailed Bat known only from the Barapede Cave in Karnataka and the Siju Cave in Meghalaya*.].

• Eight species are threatened with extinction in South Asia as per the IUCN Red List.
[*It includes one Critically Endangered, three Endangered, and four Vulnerable species*.].

Bats are facing existential problems due to the increased impacts of human-induced changes in natural habitats. They are also threatened due to superstitions that does not place bats in the goodwill of humanity. With so much negativity attached to them, it is easier for us to harm and endanger bat populations and cause irreversible damage to already diminishing populations of these wonderful animals. Killing bats will not stop the spread of COVID-19, but would adversely affect the conservation status of bat populations, and all the benefits they provide to us like control of mosquito-borne diseases such as dengue, chikengunya, malaria, etc., pollination, and forest regeneration to combat the climate crisis!

We have to learn from our experience and not take any hasty decisions that will be more damaging to humanity in the long term. Wild animals are natural reservoirs, and some species act as safety barriers for many zoonotic diseases that have the potential of becoming pandemics in very little time.

The present pandemic of COVID-19 is nature's warning to humanity.

References

Boyles, J.G., P.M. Cryan, G.F. McCracken & T.H. Kunz (2011). Economic importance of bats in agriculture. *Science* 332(6025): 41–42. https://doi.org/10.1126/science.1201366

Chan, J.F-W, S. Yuan, K-H. Kok, K.K-W. To, H. Chu, J. Yang, F. Xing, J. Liu, C.C-Y. Yip, R.W-S. Poon, H-W. Tsoi, S.K-F. Lo, K-H. Chan, V.K-M. Poon, W-M. Chan, J.D. Ip, J-P. Cai, V.C-C. Cheng, H. Chen, C.K-M. Hui & K-Y. Yuen (2020). A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *The Lancet* 395(10223): 514-523. https://doi.org/10.1016/S0140-6736(20)30154-9

Forster, P., L. Forster, C. Renfrew & M. Forster (2020). Phylogenetic network analysis of SARS-CoV-2 genomes. *Proceedings of the National Academy of Sciences*, Apr 2020, 202004999. https://doi.org/10.1073/pnas.2004999117

Hu, D., C. Zhu, L. Ai, T. He, Y. Wang, F. Ye, L. Yang, C. Ding, X. Zhu, R. Lv, J. Zhu, B. Hassan, Y. Feng, W. Tan & C. Wang (2018). Genomic characterization and infectivity of a novel SARS-like coronavirus in Chinese bats. *Emerging Microbes & Infections* 7(1): 1–10. https://doi.org/10.1038/s41426-018-0155-5

Kristian, G.A., A. Rambaut, W.I. Lipkin, E.C. Holmes & R.F. Garry (2020). The proximal origin of SARS-CoV-2. *Nature Medicine* 26: 450–452. https://doi.org/10.1038/s41591-020-0820-9

Kudagammana, H.D.W.S., V. Thevanesam, D.K.W. Chu, N.B. Eriyagama, J.S.M. Peiris & F. Noordeen (2018). Coronaviruses in guano from *Pteropus medius* bats in Peradeniya, Sri Lanka. *Transboundary and Emerging Diseases* 65(4): 1122–1124. https://doi.org/10.1111/tbed.12851

Kunz, T.H., E.B. de Torrez, D.M. Bauer, T.A. Lobova & T.H. Fleming (2011). Ecosystem services provided by bats, pp. 1–38. In: Ostfeld, R.A. & W.H. Schlesinger (eds). *The Year in Ecology and Conservation 2011: Annals of the New York Academy of Sciences*. Wiley, New York, USA.

Liu, J., X. Liao, S. Qian, J. Yuan, F. Wang, Y. Liu, Z. Wang, F.S. Wang, L. Liu & Z. Zhang (2020). Community transmission of severe acute respiratory syndrome coronavirus 2, Shenzhen, China, 2020. *Emerging Infectious Diseases* 26(6): 2020. https://doi.org/10.3201/eid2606.200239

Maas, B., D.S. Karp, S. Bumrungstri, K. Darras, D. Gonthier, J.C.C. Huang, C.A. Lindell, J.J. Maine, L. Mestre, N.L. Michel, E.B. Morrison, I. Perfecto, S.M. Philpott, C.H. Sekergioglu, R.M. Silva, P.J. Taylor, T. Tscharntke, S.A. Van Bael, C.H. Whelan & K. Williams-Guillen (2015). Bird and bat predation services in tropical forests and agroforestry landscapes. *Biological Reviews* 91(4): 1081–1101. https://doi.org/10.1111/brv.12211

Molur, S., G. Marimuthu, C. Srinivasulu, S. Mistry, A.M. Hutson, P.J.J. Bates, S. Walker, K. Padma Priya & A.R. Binu Priya (eds.) (2002). Status of South Asian Chiroptera: Conservation Assessment and Management Plan (C.A.M.P.) Workshop Report. Zoo Outreach Organisation, CBSG South Asia and WILD, Coimbatore, India, 320pp.

Srinivasulu, C., A. Srinivasulu & B. Srinivasulu (2020). Checklist of the bats of South Asia (v1.1). https://threatenedtaxa.org/index.php/JoTT/checklists/bats/southasia [Date of publication: 13 April 2020].

Voigt, C.C. & T. Kingston (2016). Bats in the Anthropocene. In: Voigt. C. & T. Kingston (eds). *Bats in the Anthropocene: Conservation of Bats in a Changing World*. Springer, Cham. https://doi.org/10.1007/978-3-319-25220-9_1

Wilson, D.E. & R.A. Mittermeier (eds) (2019). *Handbook of the Mammals of the World: 9. Bats*. Lynx Ediciones, Barcelona, Spain, 1008pp.

Wu, F., S. Zhao, B. Yu, Y.-M. Chen, W. Wang, Z.-G. Song, Y. Hu, Z.-W. Tao, J.-H. Tian, Y.-Y. Pei, M.-L. Yuan, Y.-L. Zhang, F.-H. Dai, Y. Liu, Q.-M. Wang, J.-J. Zheng, L. Xu, E.C. Holmes & Y.-Z. Zhang (2020). A new coronavirus associated with human respiratory disease in China. *Nature* 579: 265–269. https://doi.org/10.1038/s41586-020-2008-3

Yadav, P.D., A. Shete-Aich, D.A. Nyayanit, P. Pardeshi, T. Majumdar, R. Balasubramanian, P.T. Ullas, S. Mohandas, H. Dighe, P. Sawant, S. Patil, D. Patil, M.D. Gokhale, B. Mathapati, A.B. Sudeep, S. Baradkar, A. Kumar, R. Kharde, M. Salve, Y. Joshi, N. Gupta & D.T. Mourya (2020). Detection of coronaviruses in *Pteropus & Rousettus* species of bats from different states of India. *Indian Journal of Medical Research, Special issue on Coronavirus*. https://doi.org/10.4103/ijmr.IJMR_795_20

Zhang, L., F-M. Shen, F. Chen & Z. Lin (2020a). Origin and evolution of the 2019 novel coronavirus. *Clinical Infectious Diseases* ciaa112. https://doi.org/10.1093/cid/ciaa112

Zhang, T., Q. Wu & Z. Zhang (2020b). Pangolin homology associated with 2019-nCoV. *BioRxiv* https://doi.org/10.1101/2020.02.19.950253 (non-peer-reviewed pre-print)

Zhou, P., X.-L. Yang, X.-G. Wang, B. Hu, L. Zhang, W. Zhang, H.-R. Si, Y. Zhu, B. Li, C.-L. Huang, H.-D. Chen, J. Chen, Y. Luo, H. Guo, R.-D. Jiang, M.-Q. Liu, Y. Chen, X.-R. Shen, X. Wang, X.-S. Zheng, K. Zhao, Q.-J. Chen, F. Deng, L.-L. Liu, B. Yan, F.-X. Zhan, Y.-Y. Wang, G.-F. Xiao & Z.-L Shi (2020). A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature* 579: 270–273. https://doi.org/10.1038/s41586-020-2012-7

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Zoo Outreach Organization assists with COVID19 fight

As on 20th April, over 2.4 million COVID19 infections have been recorded worldwide from a strain of virus referred to as 'Severe Acute Respiratory Syndrome CoronaVirus 2' or 'SARS-CoV-2' causing more than 165,069 deaths. In India, the numbers are not as high as in some other countries due to the lockdown, but the disease is still on the spread.

The Ministry of Home Affairs has requested all NGOs to join hands with the government to deliver services to the elderly, persons with disabilities, children, transgender persons, and other vulnerable groups; to create awareness about prevention, social distancing, isolation, and combating stigma; to provide shelter to the homeless, daily wage workers, and urban poor families.

While the Zoo Outreach Organization office remains closed for a month now and we are all working from home, we have been contributing to the cause in various ways. Here is a small note to highlight one action that has been led earnestly by Latha Ravikumar who is doing a tremendous job along with her family members from her home. With her connections in the government hospital, she met with the local staff (the dean, the medical superintendent, the regional medical officer) to identify areas where ZOO can help.

It was understood that doctors, paramedics, and the frontline staff serving in government hospitals, during the COVID outbreak, do not have ready access to protective gear, which puts their own lives at risk. Due to the delays due to bureaucracy, it is likely that many health workers' own health will be compromised. So, to overcome the

delays and provide urgent help, ZOO is providing the simple nose/mouth masks, n95 mask, personal protective equipment, and sanitizer.

Latha and her family members are sourcing raw materials, and along with ZOO's office mom, Sarojamma, have been putting together the supplies for the COVID kit for ESI Hospital. Two batches of sanitizers, masks and PPEs have already been dispatched.

Every contribution, however big or small, is immensely valuable in this current situation. Every individual in their individual capacity can contribute and can make a big difference. While the disease continues, the pandemic is infected by a range of untruths. As WHO says we are fighting not just a pandemic, but also an 'infodemic'. Fake news spreads faster and more easily than a virus, and is just as dangerous. Please help stop the spread of fake news, and help in any realistic way to combat the disease. Stay safe. Stay positive, and help others to stay positive!

If you wish to help Latha and the ZOO team in this cause please donate by visiting the link **https://zooreach.org/donation/india/**

Brown Mongoose in Tadoba Andhari Tiger Reserve

Brown Mongoose *Herpestes fusca.*

There have been repeated observations of the Brown Mongoose *Herpestes fusca* from Tadoba Andhari Tiger Reserve (Maharashtra). These animals with their characteristic very bushy tail have been sighted late in the afternoon as well as during the night. They have been observed to scavenge on road killed insects and frogs. Most of the observations were made on a tarred main road cutting through the southern tropical dry deciduous forest comprising mainly of teak and bamboo. The animals did not appear to be elusive and shy but seemed to be tolerant of the vehicular traffic. The animal sightings (12 different sightings; 4 by the author) till date have ranged over 15km of erstwhile Chandrapur Nagpur State Highway that passes through Tadoba Forest. The first sighting was close to Padmapur Gate (20.059^{0}N & 79.312^{0}E; elevation 210m) and another sighting was at the forest rest house in Moharli Village (20.189^{0}N & 79.336^{0}E; 221m). Almost all the rest were randomly spread in between. The last sighting was in the core forest, close to the erstwhile Jamni Village (20.364^{0}N & 79.329^{0}E; 265m) almost 45km away by road.

Brown Mongoose has till now been known to occur in southern Western Ghats (over

1,000km away from these mentioned sightings) and Sri Lanka (Mudappa & Jathanna 2015), from 450–2,000 m. It shows distinct preference for evergreen forests. The compiled data for the entire known population showed occurrence in western border of Kodagu (Coorg) District, Virajpet in south Kodagu, and Ooty in the Nilgiri Hills, Tiger Shola in the Palani Hills, the High Wavy Mountains in Theni, Kalakad-Mundanthurai Tiger Reserve in Agasthyamalai Hills, the Valparai Plateau in the Anamalai Hills in Tamil Nadu, and Eravikulam National Park, Parambikulam Tiger Reserve and Peermedu in Kerala (Pocock 1939; Prater 1971; Corbet & Hill 1992; Sreehari et al. 2013; D. Jathanna pers. comm. 2014).

In southern India, Brown Mongoose have been recorded from rubbish dumps, close to human dwellings as well as scavenging on carcasses of large mammals like Gaur *Bos gaurus* in Anamalai (D. Mudappa pers. comm. 2014). It has been believed to be crepuscular and nocturnal in habit, but with day time activity (Mudappa & Jathanna 2015).

Presently, the total Indian population has been recorded only in evergreen forests of southern Western Ghats. However, Sanjay Gubbi's record from B.R. Hills Sanctuary and now Anirudh Chaoji, Shatanik Bhagwat, and Sanjay Thakur's records from Tadoba Andhari Tiger Reserve call for a better study of this animal. It is surprising that despite extensive camera trapping by various agencies, this animal was missed out. Probably it calls for a different protocol for camera trapping (including on carcasses of tiger and leopard kills).

References

Chakraborty, S., T.P. Bhattacharyya, J.K. De, M.K. Ghosh, T.K. Chakraborty & A.K. Poddar (2004). *Mammals in Fauna of Andhra Pradesh - Series 5*. Zoological Survey of India, 311pp.

Cheruvat, D., C. Radhakrishnan & M.J. Palot (2006). *Handbook on Mammals of Kerala*. Zoological Survey of India, Kolkata, 154pp.

Kamath, V. & K.S. Seshadri (2019). Observations of Brown Mongoose *Herpestes fuscus* (Mammalia: Carnivora: Herpestidae) in the wet evergreen forests of the Western Ghats, India. *Journal of Threatened Taxa* 11(12): 14587–14592. https://doi.org/10.11609/jott.5143.11.12.14587-14592

Mudappa, D. & D. Jathanna (2015). *Herpestes fuscus*. The IUCN Red List of Threatened Species 2015: e.T41612A45207051. Downloaded on 01 April 2020. https://doi.org/10.2305/IUCN.UK.2015-4.RLTS.T41612A45207051.en.

Pocock, R.I. (1939). *Mammals in Fauna of British India*. Taylor and Francis Ltd., London, 35pp.

Prater, S.H. (1971). *The Book of Indian Animals*. Third Edition. Oxford University Press, 348pp.

Roonwal, M.L. (1961). *Mammalia in The Fauna of India including Pakistan, Burma and Ceylon*, Zoological Survey of India, Calcutta, 482pp.

Sreehari, R., S. Das, M. Gnanakumar, K.P. Rajkumar, K.A. Sreejith, N. Kishor, D. Bhaskar, P.S. Easa & P.O. Nameer (2016). Recent records and distribution of the Indian Brown Mongoose *Herpestes fuscus* Gray, 1837 (Mammalia: Carnivora: Herpestidae) from the southern Western Ghats, India. *Journal of Threatened Taxa* 8(11): 9367–9370. https://doi.org/10.11609/jott.2347.8.11.9367-9370.

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Record of King Cobra preying on Tawny Cat Snake in Nepal

Envenomation by *Ophiophagus hannah*.

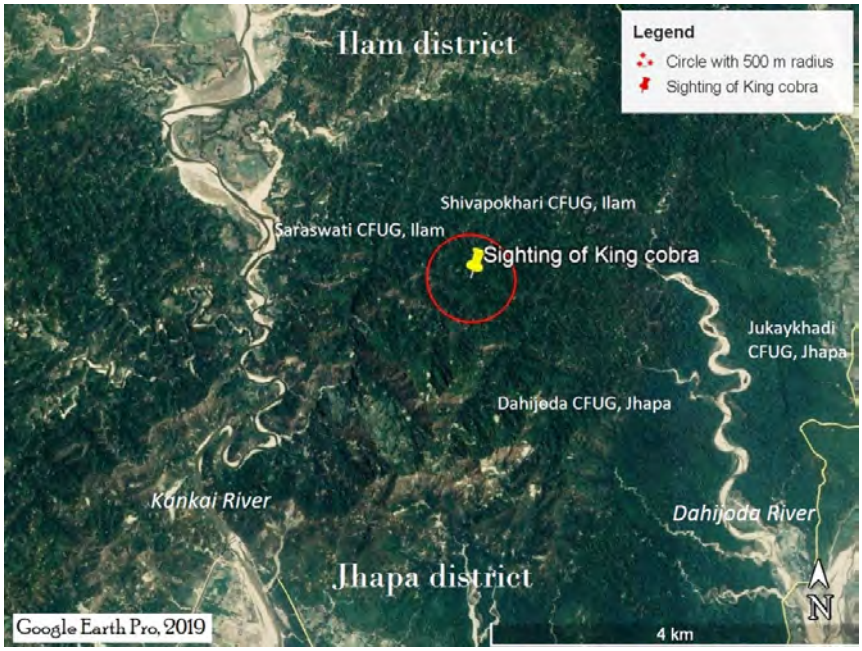
Ophiophagus hannah (Cantor, 1836), commonly known as King cobra or Hamadryad, is the world's largest venomous snake that belongs to the family Elapidae. Its body is fairly stout in adults, slender in juveniles and the flat head is distinct from neck; which is capable of dilating into an elongated hood (Schleich & Kästle 2002; Pandey 2015; Das & Das 2017). King Cobra has a large pair of occipital scales in contrast to common cobras. The dorsal colour is variable: dark brown, olive-brown or grey-black, with pale yellow or orange bands in young that may or may not persist in adults (Schleich & Kästle 2002; Sharma 2007; Kästle et al. 2013; Das & Das 2017). King cobra is endemic to forests of India and it was first reported in Nepal from Rautahat District (Fleming & Fleming 1974). As per latest literature, King Cobra has been reported in 37 districts of Nepal (Thapa et al. 2019). This magnificent snake is globally threatened mainly due to habitat destruction, illegal collection, and persecution (Stuart et al. 2012).

Here, I report the sighting of King Cobra (26.710^{0}N & 87.905^{0}E) for the first time from

Ilam District in Nepal.

southern Danabari of Mai municipality, ward number 2 in Ilam District, eastern Nepal. During the field survey in dense forest that connects southern Ilam and northern Jhapa districts, on 19 October 2019 at 14.05h a King Cobra was encountered preying on Tawny Cat Snake *Boiga ochracea* (Theobald, 1868) at an elevation of 190m above sea level. Though the site is located in Ilam, this portion of the forest is managed by Dahijoda Community Forest Users Group (CFUG) of Arjundhara municipality, ward number 4, Jhapa. In fact, this particular area is a merging point of three community forests, namely Shivapokhari CFUG-Ilam in the north, Dahijoda CFUG-Jhapa in the south, and Saraswati CFUG-Ilam in the northwest area.

Initially, the King Cobra envenomed at anterior body of its prey and slowly moved towards the head region to swallow it. On further observation, it abandoned the semi unconscious snake and escaped into the forest. The habitat consists of dense wet forest with bamboos and a hill stream known as 'Thulo Khola' (Nepali: Big stream). Three individuals of skink *Sphenomorphus maculatus* and one gecko *Cyrtodayctylus* sp. (26.708^{0}N & 87.906^{0}E) were observed in the vicinity. *Boiga ochracea* was reported from Puwa Khola, Ilam by Nanhoe & Ouboter (1987); and this observation is after 32 years.



Location of *Ophiophagus hannah*.

***Ophiophagus hannah* biting head of prey to swallow it.**

In situ habitat of *Ophiophagus hannah*.

The total body length of *Boiga ochracea* is measured 92cm with snout vent length of 84cm, and tail length of 8cm.

The total districts of King cobra occurrences have increased to 38 in Nepal. This finding of live *Ophiophagus hannah* is equally valid for Jhapa District due to its location and connectivity of forests in that area. Distribution of *Ophiophagus hannah* is important for its conservation and mitigation of probable human-snake interaction in the area.

References

Das, I. & A. Das (2018). *A Naturalist's guide to the Reptiles of India: Bangladesh, Bhutan, Nepal, Pakistan and Sri Lanka*. Prakash Books, New Delhi, India, 176pp.

Fleming, R.L. & R.L. jr. Fleming (1974). Some Snakes from Nepal. *Journal of the Bombay Natural History Museum Society* 70: 426–437.

Kästle, W., K. Rai, & H. Schleich (2013). *Field Guide to Amphibians and Reptiles of Nepal*. ARCO-Nepal, 625pp.

Pandey, D.P. (2015). *Venomous Snakes of Medical Relevance in Nepal: Study on Species, Epidemiology of Snake Bite and Assessment of Risk Factors of Envenoming and Death* (Doctoral dissertation). Goethe University, Frankfurt am Main, Germany, 231pp.

Rai, K.R. (2003). *Environmental impacts, systematic and distribution of herpetofauna from East Nepal* (Doctoral dissertation). Central Department of Zoology, Tribhuvan University, Kirtipur, 525pp.

Rai, T.P. (2019). Reassessment of herpetofauna from Jhapa District, East Nepal. *Arco-Nepal Newsletter* 19: 9–17. http://www.arco-nepal.de/ARCONewsletter19.pdf

Schleich, H.H. & W. Kästle (eds.) (2002). *Amphibians and Reptiles of Nepal: Biology, Sytematics, Field Guide*. A.R.G. Gantner Verlag, Germany, 1200pp.

Sharma, R.C. (2007). *The Fauna of India and the adjacent countries-Reptilia*. Zoological Survey of India, Kolkata, 410pp.

Stuart, B., G. Wogan, L. Grismer, M. Auliya, R.F. Inger, R. Lilley, T. Ard. Thy N. Chan-Ard, T.Q. Nguyen, C. Srinivasulu & D. Jelić (2012). *Ophiophagus hannah*. http://dx.doi.org/10.2305/IUCN.UK.2012-1.RLTS. T177540A1491874.en.14. Assessed on 22 October 2019.

Thapa, K.B., N. Rana, & K.B. Shah (2019). Distribution of King Cobra in Nepal. *The Himalayan Naturalist* 2(1): 26–33.

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Bugs R All
Newsletter of the
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First record of Vagrant *Vagrans egista sinha* from Uttar Pradesh, India

Vagrant *Vagrans egista sinha* perching

The butterfly diversity of Uttar Pradesh is still unexplored and relatively less studied by the researchers. There are only a few checklists from the state that are deficient to represent the complete order Lepidoptera (Sharma 2007; Kumar 2012).

This paper reports the first record of the Vagrant *Vagrans egista sinha* (Kollar, 1844) (Lepidoptera: Papilionoidea: Nymphalidae) from Uttar Pradesh, India. The species is known from Himachal Pradesh (Kirti et al. 2016), Uttarakhand to northeastern India, Jharkhand, West Bengal, and Odisha (Varshney & Smetacek 2015).

During a field study on 29 December 2018, *V. egista sinha* was recorded along the Khairman Reservoir in Balrampur District of Uttar Pradesh, India. The reservoir is located at 27.770N & 82.221E and spread over 185.27ha. Balrampur is a part of the

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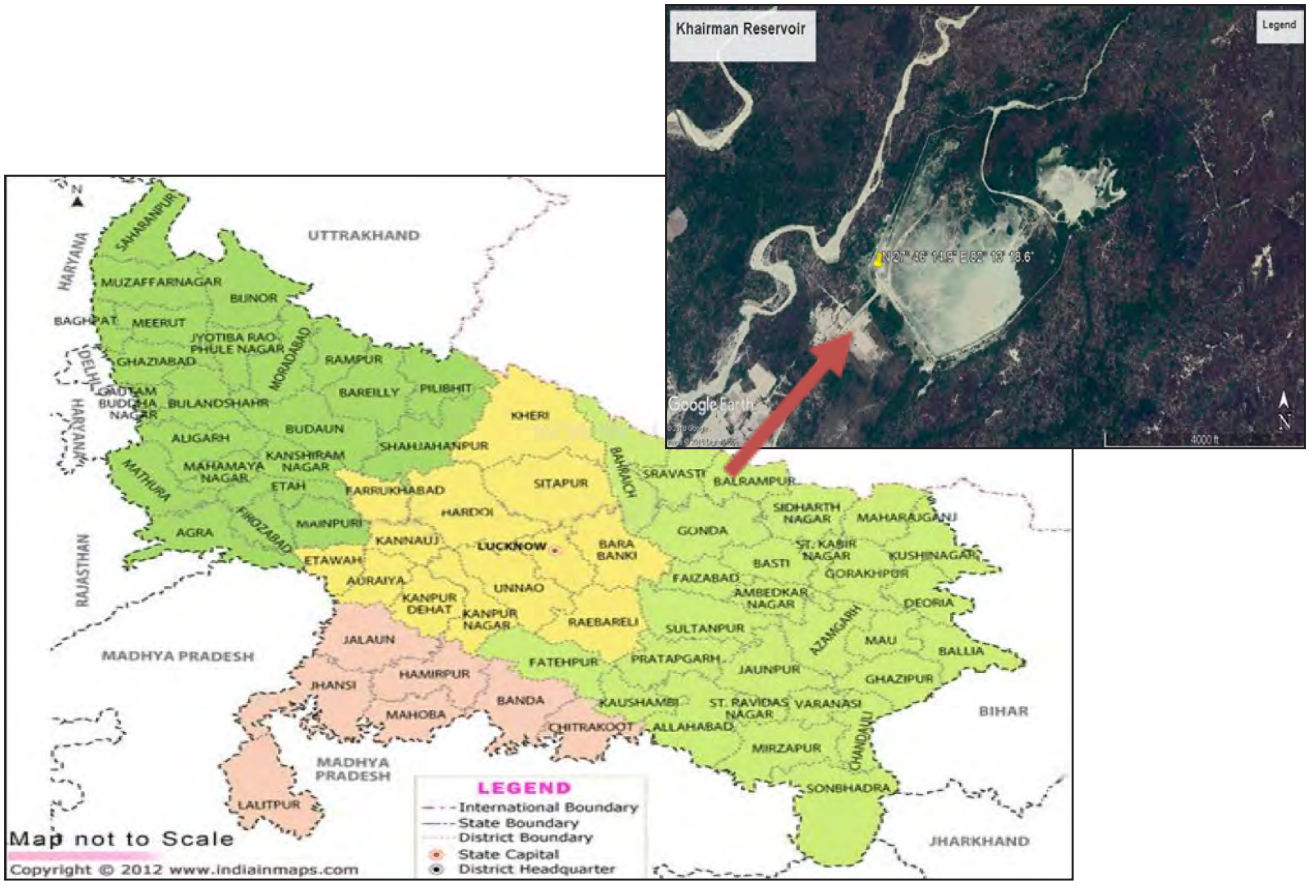

Map of Uttar Pradesh showing Khairman Reservoir located in Suhelwa Wildlife Sanctuary, Balrampur.

Terai region ecosystem, which is made up of tall wet grasslands and swamps where many threatened species thrive and the area is top priority for conservation (Rahmani 1992; Javed 1996; Rahmani & Islam 2000). The region is an important biodiversity hotspot for the state and plays a vital role in housing rich biodiversity within the three protected areas of Dudhwa Wildlife Sanctuary, Kishanpur Wildlife Sanctuary, and Katerniaghat Wildlife Sanctuary (Kumar et al. 2002).

The butterfly was observed perching and feeding on *Lantana camara*. The photographs were taken using 7D DSLR Canon camera. The species was identified as Vagrant *V. egista sinha* on the basis of the cell that has three black sinuous lines and a line along the disco-cellulars. The interspaces beyond the apex of the cell are dark brown, the dark colour continues out in interspace 4 and joins a broad oblique short band from the costa. The dusky-brown shading at the bases of interspaces 1–3 darkens outwards; other identifying features incorporate a transverse postdiscal series of dark brown spots, intervallic by large quadrate dark brown marks in interspace 4

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and below costa; a subterminal lunular line and a broad terminal band dark brown or black (Bingham 1905).

This first record of *Vagrans egista sinha* shows that there are gaps in our information on the current knowledge on the distribution of butterflies in Uttar Pradesh. Further extensive biodiversity surveys and systematic studies are required to update the butterfly fauna of the state.

References

Bingham, C.T. (1905). *The Fauna of British India, Including Ceylon and Burma Butterflies - 1 (1st edition)*. Taylor and Francis, Ltd., London, 415–416pp.

Javed, S. (1996). Study on bird community structure of Terai Forest, in Dudwa National Park. PhD thesis. Department of Wildlife Sciences, AMU, Aligarh.

Kirti, J.S., D. Mehra & A.K. Sidhu (2016). *Vagrans egista sinha* (Kollar, 1844) (Lepidoptera: Papilionoidea: Nymphalidae): range extension and an addition to the butterfly fauna of Himachal Pradesh, India. *Check List* 12(4): 1–3. https://doi.org/10.15560/12.4.1923

Kumar A. (2012). A report on the Butterflies in Jhansi (U.P.) India. *Journal of Applied and Natural Science* 4(1): 51–55. https://doi.org/10.31018/jans.v4i1.221

Kumar, H., P.K. Mathur, J.F. Lehmkuhl, D.S. Khati, R. De & W. Longwah (2002). Management of Forests in India for Biological Diversity and Forest Productivity: A New Perspective: Terai Conservation Area (TCA). Vol. VI. WII-USDA Forest Service Collaborative Project Report. Wildlife Institute of India, Dehra Dun, 158pp.

Rahmani, A.R. (1992). Threatened Fauna of the Indian Grasslands, pp. 143–150. In: Singh, K.P. & J.S. Singh (eds.). *Tropical Ecosystems - Ecology and Management*. Wiley Eastern Limited, New Delhi.

Rahmani, A.R. & M.Z. Islam (2000). Prioritization of the Indian Grasslands for Conservation of Biodiversity. In: Singh, S., A.R.K. Sastry, R. Mehta & V. Uppal (eds.). *Setting Biodiversity Conservation Priorities for India*. WWF-India, New Delhi, xxvii+707pp.

Sharma, N. (2007). Butterflies of Sur Sarovar Bird Sanctuary, Keetham, Agra (Uttar Pradesh, India). *Records of the Zoological Survey of India* 107(Part-2): 103–112.

Varshney, R.K. & P. Smetacek (2015). *A Synoptic Catalogue of the Butterflies of India*. Butterfly Research Centre, Bhimtal. Indinov Publishing, New Delhi, ii+261pp+8pls.

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Ginger herb *Meistera fulviceps*: a new distribution record for Tamil Nadu

***Meistera fulviceps* (Thwaites) Skornick. & M.F. Newman**
a—Habit | b—Close-up view of inflorescence | c—SEM image of pollen grain.

The genus *Amomum* Roxb. has been recircumscribed recently by de Boer et al. (2018) in a multi-marker phylogenetic framework with morphological characters which resulted in a more precise identity and nomenclatural stability. They resurrected the genus *Meistera* Giseke and listed 42 species and three varieties segregated from the genus *Amomum* (sensu lato). The genus *Meistera* is characterized by the semilunar anther crest, echinate fruits and fertile bracts supporting a single flower and is mainly distributed in tropical and subtropical Asia and Australia (de Boer et al. 2018). In India it is represented by 13 species distributed in northeastern India and peninsular India. Thomas et al. (2009) reported the occurrence of *Amomum fulviceps* Thwaites in India from Thiruvananthapuram District of Kerala; which was earlier reported only from Sri Lanka. They provided a detailed description, color photographs with distinguishing characters of *A. fulviceps* from the allied taxa, viz., red colored bracts, pale yellow flowers with 3-clefted calyx tube, trilobed labellum and echinate, red capsules. During the floristic survey of Kanyakumari Wildlife Sanctuary in Tamil Nadu, the authors collected specimens

of *Amomum*. After critical study of the specimens and perusal of literature (Thwaites 1864; Henry et al. 1989; Sabu 2006; Thomas et al. 2009; de Boer et al. 2018), according to the updated nomenclatural concept, the plant is identified as *Meistera fulviceps* (Thwaites) Skornick. & M.F. Newman (= *Amomum fulviceps* Thwaites). The present collection of *Meistera fulviceps* (Zingiberales: Zingiberaceae) forms an addition to the flora of Tamil Nadu. A brief description with details of pollen grains (SEM) and photographs are provided.

Meistera fulviceps (Thwaites) Skornick. & M.F. Newman, Taxon 67: 26. 2018. *Amomum fulviceps* Thwaites, Enum. Pl. Zeyl.: 317. 1864; Baker in Hook.f., Fl. Brit. India 6: 237. 1892; Trimen, Handb. Fl. Ceylon 4: 252. 1898; B.L. Burtt & R.M. Sm. in Dassan., Rev. Handb. Fl. Ceylon 4: 526. 1983; V.P. Thomas, Sanoj, M. Sabu & Prasanth in Rheedea 19: 13–17. 2009.

Medium-sized to large herbs; rhizome fibrous. Leafy shoots distichous, 150–180 cm high. Leaves 10–14 per shoot; lamina lanceolate, 32–40 × 6–7 cm, base acute, apex acuminate, glabrous; petiole 1–2 cm long, grooved above. Ligule 1.5–2 cm long, glabrous, green. Spike arising from the rhizome, compact, many flowered, up to four flowers at a time; peduncle 5–8.5 cm long. Bract ovate, 2–3.5 × 1–1.7 cm, red, appressed-pubescent outside, hair yellowish brown when dry. Bracteole tubular, 1.5–2 × 0.3–0.5 cm, pink, 2-lobed. Flower 3.5–4 cm long, yellowish white. Calyx tubular, 2–2.4 × 0.3–0.5 cm, pale pink, 3-clefted, hairy outside, glabrous inside. Corolla tube 1.5–2 cm long, ca. 2 mm wide at mouth, pale yellow, pinkish towards base; dorsal corolla lobe ovate, 1.3–1.5 × ca. 0.9 cm, pale yellow, pubescent outside, glabrous inside; lateral corolla lobes oblong ca. 1.5 × 0.6 cm, pale yellow, pubescent outside, glabrous inside. Labellum obovate, 3-lobed, pale yellow, glabrous. Lateral staminodes reduced. Stamen 1–1.2 cm long, creamy white; connective produced into a crest; crest semi-lunar, pale yellow; theca oblong, creamy. Epigynous glands 2, oblong, creamy, glabrous. Ovary inferior, obconic ca. 5 × 3.6 mm, densely villous outside, 3-loculed; ovules many on axile placentation;

Herbarium sheet of *Meistera fulviceps* [144682 (MH)].

style linear; stigma subglobose. Capsule 3–6 per spike, globose, 1.5–3 cm, red, densely echinate, pubescent. Seeds many, angular, red, arillate; aril white.

Specimens examined: 144682 (MH), 06.ii.2019, Muthukuzhivayyal, Azhagiyapandipuram Range, Kanyakumari Wildlife Sanctuary, Tamil Nadu, 8.729^{0}N & 77.512^{0}E, 1,330m, coll. K.A. Sujana & Rakesh G. Vadhyar.

Flowering and Fruiting: January–April.

Habitat: Rarely distributed in tropical evergreen forests and tropical montane forests at an altitude between 1100–1400 m in moist and shady areas.

Distribution: India and Sri Lanka; in India this species is reported so far from Thiruvananthapuram District of Kerala and Kanniyakumari District of Tamil Nadu.

Pollen morphology: Pollen grains are spherical, 48–57 µm in diameter, exine surface echinate; spine uniformly distributed, apex blunt.

References

de Boer, H., M. Newman, A.D. Poulsen, A.J. Droop, T. Fér, T.T. Hiền, K.H. Le, V. Lamxay, J.E. Richardson, K. Steffen & J.L. Škorničková (2018). Convergent morphology in Alpinieae (Zingiberaceae): Recircumscribing *Amomum* as a monophyletic genus. Taxon 67(1): 6–36.

Henry, A.N., V. Chitra & N.P. Balakrishnan (1989). *Flora of Tamil Nadu, Series I: Analysis Vol. 3*, Botanical Survey of India, Coimbatore, 171pp.

Sabu, M. (2006). *Zingiberaceae and Costaceae of South India*. Indian Association for Angiosperm Taxonomy, Calicut University, Kerala, 282pp.

Thomas, V.P., E. Sanoj, M. Sabu & A.V. Prasanth (2009). On the identity and occurence of *Amomum fulviceps* Thwaites (Zingiberaceae) in India. *Rheedea* 19: 13–17.

Thwaites, G.H.K. (1864). *Enumeratio Plantarum Zeylaniae: An Enumeration of Ceylon Plants*. Dulauco, London, 483pp.

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Rotala mexicana, an addition to the flora of Gujarat, India

***Rotala mexicana* Cham. and Schlecht.: a—habitat | b—habit. © S.K. Patel & P.R. Desai.**

The genus *Rotala* L. with more than 55 species is distributed in tropical and subtropical regions of the world (Cook 1979) of which 29 species are reported so far from India (Narayanan et al. 2014). Lemiya & Pradeep (2015) recently described one more species *Rotala anamika* Lemiya from Kerala. The authors during their intensive botanical explorations in various parts of northern Gujarat came across an interesting specimen of *Rotala* at the plain terrain in Vijaynagar near Zer-Bhankhara forest of Sabarkantha District on soil following rain. It is restricted to a limited area with 6–8 individuals per square meter. The population distribution of the species is clumped. Specimens were collected and properly processed for preparing herbarium by using the standard methods recommended by Santapau (1955) and Jain & Rao (1977). After critical examination of all morphological features and perusal of relevant literature available (Cook 1979; Joseph & Shivrajan 1989; Lemiya & Pradeep 2015), the specimens were identified as *Rotala mexicana* Cham & Schlecht. Prior to this finding, there were four species of *Rotala* reported from Gujarat. *Rotala mexicana* was not recorded in any work pertaining to Gujarat. Hence, it forms a new addition to the flora of Gujarat State. A voucher specimen has been deposited at the Department of Botany, The M.S. University of

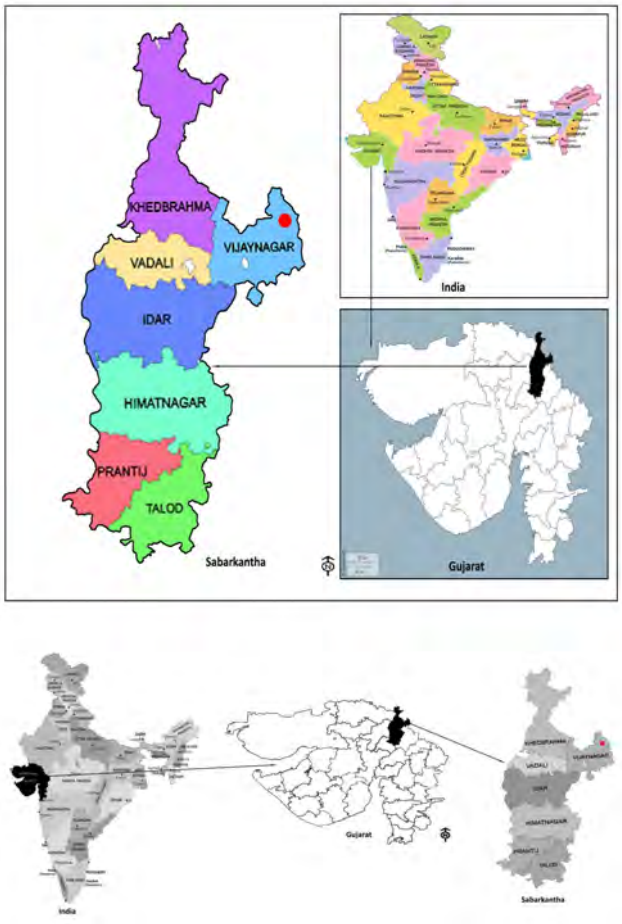
Baroda, BARO Herbaria, Vadodara (Gujarat). A brief description along with notes on habitat, distribution, phenological data, and photographs is provided here to facilitate easy identification of the species in the wild. In addition, a key to the species of *Rotala* found in Gujarat has also been provided.

Key to the species of *Rotala* found in Gujarat

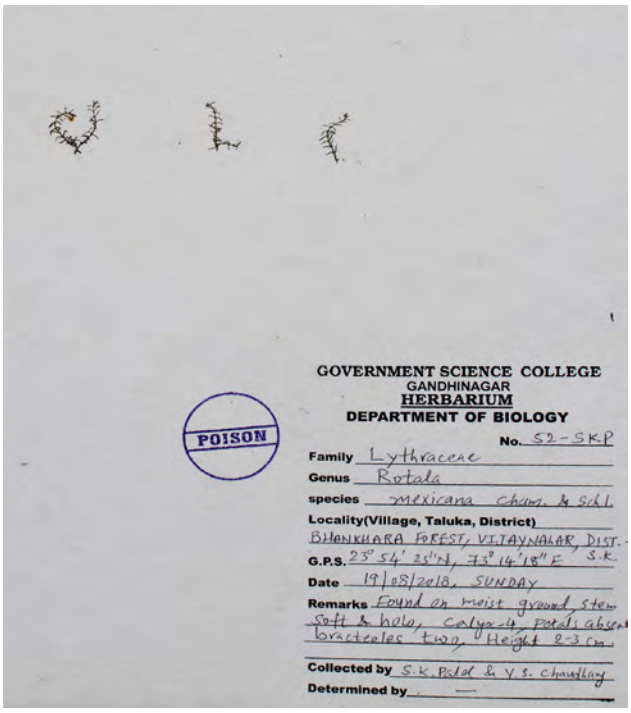
1. Leaves opposite decussate, flowers petaliferous 2
1. Leaves opposite decussate or in whorls of 3, flowers apetalous 4
2. Calyx appendages present ..... *R. densiflora*
2. Calyx appendages absent 3
3. Calyx tube constricted above; petals longer than calyx lobes ..... *R. serpyllifolia*
3. Calyx tube not constricted; petals half as long as calyx lobes ..... *R. indica*
4. Bracteoles leaf-like, partly or completely enclosing the flower ..... *R. occultiflora*
4. Bracteoles scarious, not enclosing the flower ..... *R. mexicana*

Rotala mexicana Cham & Schlecht., Linnaea 5: 567, t. 830; Koehne, Bot. Jahrb. 1: 150. 1880 & in Engl., Pflanzenr. 17 (4, 216): 29. 1903; Blatt & Hallb., J. Bombay Nat. Hist. Soc. 25: 702. 1918; Van Leeuwen, Blumea 19: 54. 1979; Cook, Boissiera 29: 33. 1979; Philcox, Kew Bull. 41: 43. 1986.

Prostrate herbs, 2–3 cm long, stem soft, hollow, branched, slender, 4-angled, creeping or ascending, rooting at nodes. Leaves in whorls (3 on each node) or opposite decussate in upper portion, linear-oblong. Bracts leaf-like. Bracteoles two, linear, scarious, not enclosing the flower, usually as long as calyx tube. Flowers monomorphic, apetalous, solitary, axillary, sessile, less than 1mm long. Calyx tube 0.6mm long, pink, lobes 4, triangular, without appendages. Petals absent. Stamens usually 2, inserted near the base of calyx tube, not exerted. Ovary globose; style short; stigma capitate. Capsule globose, ca. 0.8mm across, 2–3-valved, slightly exceeding the calyx lobes. Seeds 10–18, 0.3mm long, smooth, black, semi-obovate.



Map showing location of *Rotala mexicana* Cham. and Schlecht.



Herbarium sheet of *Rotala mexicana* [#SKP - 052].

Specimen examined: SKP-52, 19.viii.2018, Gujarat, Sabarkantha District, Vijaynagar, Zer-Bhankhara forest, 23.906^{0}N & 73.238^{0}E, 293m, coll. Suresh K. Patel (BARO Herbarium).

Field notes: It is found on wet mud following rain with limited distribution in the area. Several species seem to be associated with the plants including *Funaria* sp. *Ophioglossum* sp., *Eriocaulon* sp., *Lindernia ciliata*, *Lindernia indica*, *Cyperus triceps*, and grasses. It is very short lived and completes its life cycle within 30–35 days.

References

Cook, C.D.K. (1979). A revision of the genus *Rotala* (Lythraceae). *Boissiera* 29: 1–156.
Jain, S.K. & R.R. Rao (1977). *Field and Herbarium Methods*. Today and Tomorrow´s Printers and Publishers, New Delhi, India, 157pp.
Joseph, K.T. & V.V. Sivarajan (1989). *Rotala* Linn. (Lythraceae) in peninsular India. *Proceedings of the Indian Academy of Science* (Plant Sciences) 99: 179–197. https://doi.org/10.1007/BF03053593
Lemiya, K.M. & A.K. Pradeep (2016). A new species of *Rotala* (Lythraceae) from Kerala, India. *Rheedea* 25: 159–163.
Meena, S.L. (2012). A checklist of the Vascular Plants of Banaskantha District, Gujarat, India. *Nelumbo* 54: 39–91. https://doi.org/10.20324/nelumbo/v54/2012/57387
Narayanan M.K.R., C.N. Sunil, T. Shaju, M.K. Nandakumar, M. Sivadasan & A.H. Alfarhan (2014). *Rotala dhaneshiana*, a new species of Lythraceae from India. *Phytotaxa* 188(4): 227–232. https://doi.org/10.11646/phytotaxa.188.4.5
Parmar, P.J. (2012). A checklist of the Vascular Plants of Sabarkantha District, Gujarat, India. *Nelumbo* 54: 92–137. https://doi.org/10.20324/nelumbo/v54/2012/57388.
Raghvan, R.S., B.M. Wadhwa, M.Y. Ansari & R.S. Rao (1981). A check list of plants of Gujarat. *Records of the Botanical Survey of India* 21: 1–120.
Santapau, H. (1955). *Botanical collectors manual*. Ministry of Natural Resources and Science Research, New Delhi, 62pp.
Saxton, W.T. & L.J. Sedgwick (1918). Plants of Northern Gujarat. *Records of the Botanical Survey of India* 6(7): 209–323 and i-xiii. Superintendent Government Printing, India.
Shah, G.L. (1978). *Flora of Gujarat State*. Vol. I & II. Sardar Patel University Press, Vallabh Vidhyanagar, 1074pp.

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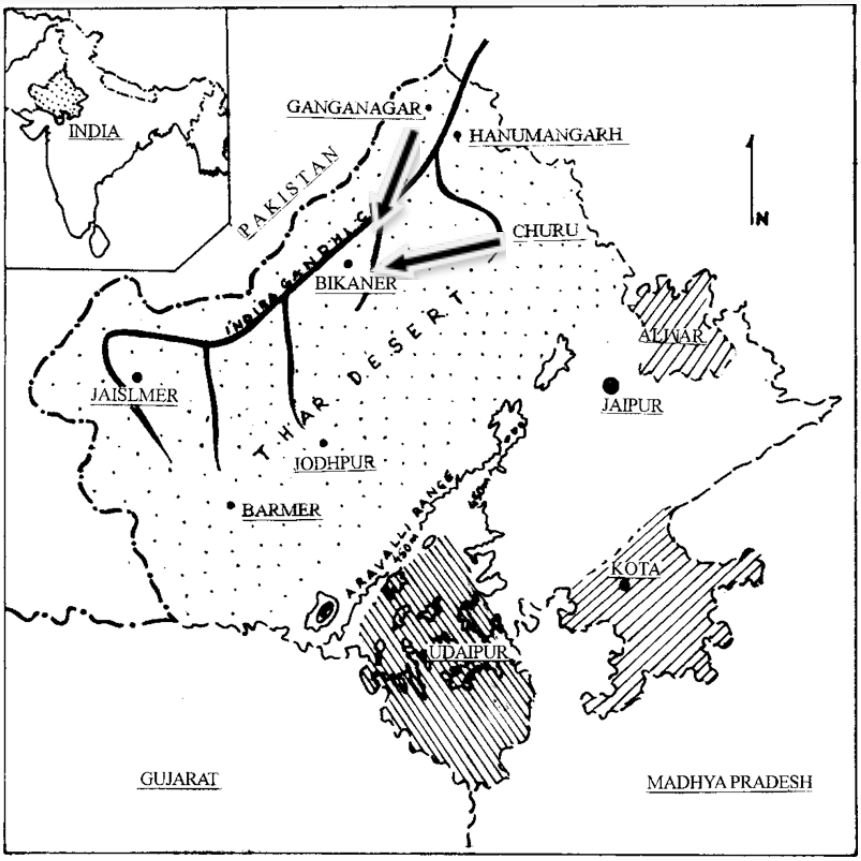
Black Francolin expanding its range into Thar Desert

Black Francolin male in the Vallabhgarden area of Bikaner region. © Jitendra Solanki.

Black Francolin *Francolinus francolinus* (Linnaeus, 1766), a resident species in its range, is well distributed from southern Afghanistan through Indus Valley of Pakistan, Kachchh in Gujarat, along the Himalaya to Assam, to Bangladesh, to Odisha and central India (Rasmussen & Anderton 2012). Though the species is assessed as Least Concern as per IUCN Red List, its population is declining in many parts of its distribution range (Birdlife International 2018). Grimmet et al. (1998) and Kazmierczak & Perlo (2000) report that the species is almost absent from the Indian part of Thar Desert except small patches in Sri Ganganagar District. The species occurs here, maybe, due to alteration of habitat as irrigation has been in practice since 1960 in this area (Singh et al. 2009). Roberts (1991) reported that the species had declined rapidly during early 90s in Pakistan in most of its distribution range and is entirely absent from the main desert tracks of Thar or Cholistan.

Though Black Francolin has been frequently reported from Tal Chhapar Blackbuck Sanctuary, which is largely a flat tract of grassland present in Churu District, it is

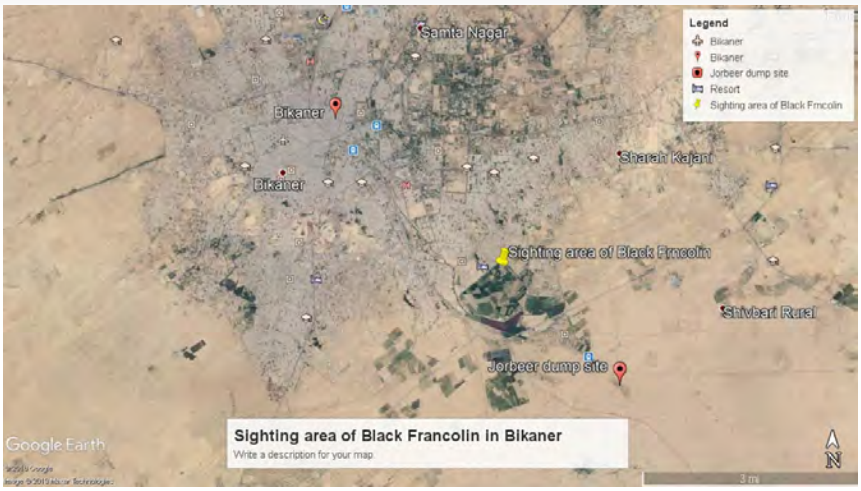


Map of Thar showing possible ingression of Black Francolin towards core areas.

absent from the rest of Thar. Rahmani (1996) and Rana et al. (1996) did not report it from the Thar, but Dhillon (1984) and Sangha (1984) reported its occurrence in the area of Ganganagar District falling in Thar Desert. We have recently sighted this species in Vallabh Garden Area of Bikaner District (27.592^{0}N & 73.210^{0}E) which is about 250km from Sri Ganganagar. This is a first report of the species from the core area of Thar Desert. We had earlier sighted this species in Jhunjhnu and Churu districts of Rajasthan and Suratgarh Tehsil of Sri Ganganagar District. The avian diversity of Thar Desert is changing considerably due to Indira Gandhi Canal and several species appear to be invading the core region of Thar Desert because of these ecological changes (Patil et al. 2015; Bhardwaj & Sangha 2016). It is conjectured that Black Francolin is also expanding in the Thar region from areas adjoining to Punjab and Haryana. It may not have invaded from eastern Rajasthan as there appear to be a large gap between the canal and eastern Rajasthan. An early study of Behbash et al. (2010) in southwestern Iran indicates that both plant height and

Table 1. Some recent records of the Black Francolin in the Thar Desert.

	Location	Date of observation	Observer/ s	No. of individuals
1.	Tal Chhapar	12.iv.2016	Jitendar Solanki, Veer Vaibhav Mishra	03
2.	Suratgarh	15.ii.2015	Partap Singh	01
3.	Bikaner	17.viii.2016	Partap Singh, Jitendar Solanki	03
4.	Jhunjhunu	20.ii.2015	Partap Singh, Jitendar Solanki	02
5.	Tal Chhapar	07.i.2017	Jitendar Solanki, Gautam	01
6.	Bikaner	29.vi.2017	Partap Singh, Jitendar Solanki	02



Sighting area of Black Francolin.

plant cover are important factors for occurrence of Black Francolin. It is surmised that with expansion of agriculture and increase in the grassland, the species would establish its population in the areas of Thar desert from where it was hitherto not reported.

References

Behbash, R., M. Karami, A. Mahiny, M. Nabavi & N. Khorasani (2010). Effect of plant cover on presence of Black Francolin (*Francolinus francolinus*) in Khouzestan Province, South-western Iran. *African Journal of Biotechnology* 9(25): 3847–3851.

Bhardwaj, G.S. & H.S. Sangha (2016). Nesting of Purple-rumped Sunbird *Leptocoma zeylonica* in southern Rajasthan, and its occurrence in the Thar Desert. *Indian Birds* 12(1): 10–11.

BirdLife International (2018). *Francolinus francolinus*. The IUCN Red List of Threatened Species2018:e. T22678719A131903818. https://doi.org/10.2305/IUCN.UK.2018.RLTS.T22678719A131903818.en. Downloaded on 05 May 2019.

Dhillon, K.B.S. (1984). Black Partridge in Ganganagar, Rajasthan. *Newsletter for Birdwatchers* 24(9-10): 11–12.

Grimmet, R., C. Inskipp & T. Inskipp (1998). *Birds of Indian Subcontinent*. Oxford University Press, Delhi, 888pp.

Kazmierczak, K. & B.V. Perlo (2000). *A field Guide to the Birds of India, Sri Lanka, Nepal, Bhutan, Bangladesh and the Maldives*. Om Book Service, Noida, 352pp.

Patil, P., S.S. Surve, N. Khan & S. Narwade (2015). Jungle Babbler *Turdoides striata* at Tanot in Thar Desert, western Rajasthan: a range extension. *Journal of the Bombay Natural History Society* 111: (3) 224–225.

Rahmani, A.R. (1996). Changing avifauna of the Thar Desert, pp. 307–324. In: Gosh, A.K., Q.H. Baqri & I. Prakash (Eds.), *Faunal Diversity in the Thar Desert : Gaps in Researches*. Scientific Publishers, Jodhpur, 410pp.

Rana, B.D., A.P. Jain & R.S. Tripathi (1996). Avian diversity in the Thar Desert, pp. 325–332. In: Gosh, A.K., Q.H. Baqri & I. Prakash (eds.). *Faunal Diversity in the Thar Desert: Gaps in Researches*. Scientific Publishers, Jodhpur, 410pp.

Rasmussen, P.C. & J.C. Anderton (2012). *Birds of South Asia: The Ripley Guide 2nd Edition*. 2 volumes. Lynx Edicions, Barcelona, 1072pp.

Roberts, T.J. (1991). *The Birds of Pakistan. Non-passeriformes*. Vol.I. Oxford University Press, Karachi, 666pp.

Sangha, H.S. (1984). Miscellaneous observation: Black Partridge in Ganganagar District, Rajasthan. *Newsletter for Birdwatchers* 24(5–6): 12.

Singh, P., R. Sharma & K. Dev (2009). Changing climate and its implications on the biodiversity of the Thar desert. *Proc. Natn. Conf. Envtl. Health Hazards*, Kota, 193–195.

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Population decline of Malabar Pied Hornbill in Janjgir-Champa, Chhattisgarh

Malabar Pied Hornbill perched on *Bombax ceiba* trees at Pacheda Village, Janjgir-Champa. © Kumar Singh.

Malabar Pied Hornbill *Anthracoceros coronatus* (Aves: Bucerotiformes: Bucerotidae) is found in the Western Ghats, and Dandeli, Haliyal, Kulgi, Ambika nagar and Ganeshgudi, Uttara Kannada District, Karnataka (between 14.75^0–15.416^0 N and 74.416^0–74.833^0 E) and Amboli, Sindhudurg District, Maharashtra, Goa State are key areas for its occurrence (Mudappa & Raman 2009; Sneha & Davidar 2011). It is a resident species in the peninsular hills and is also found in West Bengal and Bihar, northern Andhra Pradesh, the Western Ghats (mainly along the eastern edge), southern Maharashtra (Ratnagiri), and Sri Lanka (Rasmussen & Anderton 2005). It is a Near Threatened species (BirdLife International 2015) and its population is declining due to poaching (Ripley 1982; Dev 1992) and habitat destruction (Reddy et al. 1990; Zacharias & Gaston 1999). This has caused drastic population decline during the last few decades. According to Pande et al. (2003), it is a resident of the Konkan, Malabar and the Western Ghats up to an elevation of 1,000m.

Malabar Pied Hornbill *Anthracoceros coronatus* was reported by the first author in Janjgir-Champa District of Chhattisgarh State and monitored every year. This species was recorded here since 2001. There is, however, lack of knowledge about their presence in the forest of Janjgir and Baloda block. The first author often observed this species in the villages of Janjgir District, viz.: Jobi, Birgahni, Jarve, Pacheda, Kasundi, Munund,

and forest range of Khisora & Pantora Baloda block. Mostly, they were seen on large-sized Arjun trees *Terminalia arjuna* located in Nala areas. Apart from this, they were observed in Mango *Mangifera indica*, Neem *Azadirachta indica*, 'Pipal' *Ficus religiosa*, 'Bargad' *Ficus benghalensis*, and 'Semal' *Bombax ceiba* trees. Malabar Pied Hornbill was seen foraging on the fruits of *Ficus* spp. an abundant tree species in the studied area. According to Reddy & Basalingappa (1993), most of the fruit species utilized by this species contain a high percentage of water; the most favored fruits, *Strychnos* and *Ficus benghalensis*, contain 79.86% and 72.90% water, respectively.

In the month of September, they were found in small flocks of 3–5 individuals but later on during December to January, their flock size increased to 22 individuals. They were also recorded up to 30km away from Janjgir in Khisora and Pantora forest range of Baloda block. For the last 2 years, however, Malabar Pied Hornbills have not been seen in Janjgir forest, most probably due to large scale illegal tree felling. Observations and photographs were started from the year 2013 and every year their population is decreasing in some of the areas. Malabar Pied Hornbill visits selected forest areas every year, possibly due to less disturbance in such areas. Due to habitat degradation and illegal poaching, however, their population is decreasing. This species should be considered for conservation initiatives/ programmes by the forest department on priority basis as well as by local communities of the area to support birding tourism in Chhattisgarh.

References

BirdLife International (2015). Species factsheet: *Anthracoceros coronatus*. Downloaded from http://www.birdlife.org.

Dev, U.N. (1992). Rearing of Malabar Pied Hornbill (*Anthracoceros coronatus*) in Bihang Institute for Ornithology and Mass Education. *Bihang Newsletter* 1: 1–16.

Mudappa, D. & T.R.S. Raman (2009). A conservation status survey of hornbills (Bucerotidae) in the Western Ghats, India. *Indian Birds* 5(4): 90–102.

Pande, S., S. Tambe, C.F. Francis & N. Sant (2003). Birds of Western Ghats. Kokan and Malabar (Including birds of Goa). Oxford University Press and Bombay Natural History Society, India, 178pp.

Rasmussen, P.C. & J.C. Anderton (2005). *Birds of South Asia: The Ripley Guide*. Washington, DC (p. 273).

Reddy, M.S. & S. Basalingappa (1993). The food of the Malabar Pied Hornbill. *Journal of the Ecological Society*, 8, 23-28.

Reddy, M.S., K.S. Muralidhar, M.R. Gandhi & S. Basalingappa (1990). Distribution and variation in number of Malabar Pied Hornbills *Anthracoceros coronatus* (Boddaert) in selected areas of north Kanara forest of Western Ghats in Karnataka, India. *The Indian Zoologist* 14: 63–73.

Ripley, S.D. (1982). *Synopsis of the birds of India and Pakistan*. Second edition, Bombay Natural History Society, Mumbai (p. 220).

Sneha, V. & P. Davidar (2011). Status survey of the Malabar Pied Hornbill in the Dandeli region, northern Western Ghats, India, *The Raffles Bulletin of Zoology* 24: 45–51.

Zacharias, V.J. & A.J. Gaston (1999). The recent distribution of endemic, disjunct and globally uncommon birds in the forests of Kerala State, south-west India. *Bird Conservation International* 9: 191–225.

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Ecology of Bronze-winged Jacana and Pheasant-tailed Jacana within Makhana field habitat

Euryale ferox Salisb, known as Gorgon or prickly waterlily is locally called Makhana in India. It is a floating macrophyte that grows in wetland ecosystems, especially in marshy and muddy wetland habitats (Cronquist 1981). The characteristic feature of this species is its leaves which are large and take a long time to grow completely. Makhana with its large leaf provides an ideal habitat for two species of long-legged waterbirds, Bronze-winged Jacana *Metopidius indicus* and Pheasant-tailed Jacana *Hydrophasianus chirurgus*. These birds have distinguished morphological characters such as a long tail (long arching plumes) and legs with elongated toes and claws.

The geographical distribution of these two species is around the world's tropical and subtropical wetlands (Whittingham et al. 2000). Both belong to the monotypic genera (genera that contain only one species) (Whittingham et al. 2000). The IUCN Red List has classified the Bronze-winged Jacana as Near Threatened and the Pheasant-tailed Jacana as Least Concern.

Jacanas are polyandrous (females mate with more than one male) and also exhibit sex-role reversal—male jacana is likely to build nest, incubate and take care of the chicks (Eens & Pinxten 2000). With this background and knowledge a study was conducted on these two species specifically looking at their diet and nesting. The study was conducted in different experimental Makhana cultivation plots in the Indian state of Bihar.

The results of this study will help in the management and conservation of these two aquatic species.

Materials and methods

Study area: The experimental Makhana field at Research Center for Makhana (RCM) is located at 26.189^{0}N & 85.905^{0}E. It lies in Darbhanga District of Bihar, India (Image 1).

The observations of the birds was based primarily on the field work conducted during May–October 2019. In the experimental Makhana field, Makhana was cultivated under two different systems according to their water depth, viz., pond system method/ PSM (1–2 m depth, area 1,600m^2) and field system method/FSM (0.3m depth, 6,400m^2) (Image 1a,c, 2a,c).

Birds were observed from 05.00–07.00 h and 14.00–15.00 h, and identified using Bushnell binoculars (20x50) and a field guide (Grimmet et al. 2016). The Makhana leaves were collected from the habitat for examining living matter. The samples were stored in

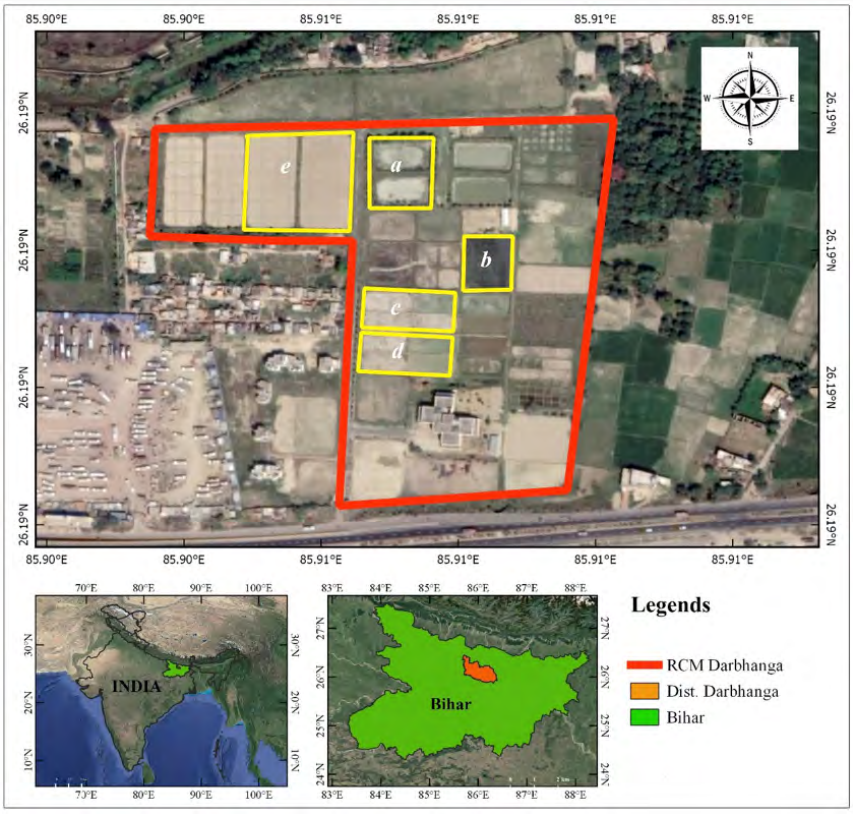

Image 1. Experiment Makhana cultivation field at RCM Darbhanga, Bihar, India: a—pond system method of Makhana cultivation | b—water chestnut nursery | c—field system method of Makhana cultivation | d—lotus cultivation farm | e—rice field.

a formaldehyde solution (4%), and examined using a 10X–40X microscope.

It was noted that the Bronze-winged Jacana's preferred habitat was field system method (FSM) and Water Chestnut *Trapa bispinosa* Roxb. nursery field with a large area. The Pheasant-tailed Jacana preferred a small area within the pond system. This could possibly be due to its long tail and legs which are better suited for walking on the floating leaves. Both the species were feeding alone and were not competing while foraging.

During the month of May (when the Makhana seedlings are very small), and post growth period in the month of June, Pheasant-tailed Jacana were reported in Makhana pond system.

Both the species laid their eggs in the first week of July among the newly emerged Makhana leaves in Makhana Pond system method (PSM). Each clutch had three eggs of pale yellow color with black spots, and the size may vary between 25mm and 30mm. The chicks hatched out in the last week of July with a 100% success rate. The protection provided to the eggs and chicks by the bowl-shaped Makhana leaves with thorns that protected the nest might be the reason for the birds breeding in this habitat (Fig 3d). The male Pheasant-tailed Jacana (smaller in size) was observed nursing the chicks, and often sent out noisy alarm calls when they thought predators were within the vicinity of the nests. It was also observed that male jacana held their chicks in wing coverts following the alarm call (Jenni 1974; Emlen & Oring 1977). Females of both the species were usually absent or very rarely seen in the Makhana field. They were observed in near-by rice fields and water chestnut fields during the incubation period (Image 1e,b). They might be spending more time in foraging rather than care for the nest. This finding supports Chen et al. (2008),

who reported that male Pheasant-tailed Jacanas take on parental duties and females scarcely provide the care.

In August, chicks of both Bronze-winged Jacana (Image 2e) and Pheasant-tailed Jacana (Image 2b) exhibited well-developed morphological character such as beak, coverts, rump, and long legs with fine toes in the Makhana field.

Food and feeding habits

The birds were regularly observed foraging for food above and beneath the leaves, always seeking marginal parts of mature leaves.

Different food matter were collected from the young to fully mature floating leaves and also from other marginal weeds. Insect larvae (N=12) mollusks/gastropods (N=4), and periphyton were recorded in the collected leaves (Table 1). The usual diet of these two species consists of vegetable matter, seeds, roots, insects, and mollusks (Wang et al. 1998). According to the

Image 2. Habitat of Jacana birds: a—pond system method of Makhana cultivation | b—Pheasant-tailed Jacana with chicks in pond system methods | c—field system method of Makhana cultivation | d—Makhana bowl shaped young leaves | e—Bronze-winged Jacana with chicks in field system methods | f—Bronze-winged Jacana on Makhana leaves. © Shailendra M. Raut.

observations in the breeding habitat and availability of plant seeds (mostly water lily), these were also fed upon by the jacanas (Wang et al. 1998).

The present monsoon season observation (of more invertebrate diet) in the Makhana field could be because of the increased availability of these food items.

Conclusion

Wetland ecosystems in North Bihar support commercially important macrophytes like Makhana and water chestnut, and contribute to the livelihood and food security of local poor fishermen communities (Chaudhary & Prakash 2003). The mollusks are attached mainly to the lower parts of leaves and other parts of the plants to utilize the nutrients for their

Table 1. Insects and mollusks collected from Makhana leaves.

	Insect species	Common name
1.	*Paracymus vulgatus* Woold.	Water scavenger beetle
2.	*Regimbartia attenuata* Fab.	Water scavenger beetle
3.	*Paederus melampus* Erichson.	Rove beetle
4.	*Carpelimus siamensis* Fauvel.	Rove beetle
5.	*Aeoloderma trachmana* Candeze.	Chick beetles
6.	*Menochilus* sp.	Lady bird beetle
7.	*Coccinella* sp.	Lady bird beetle
8.	*Bagous* sp.	Weevils
9.	*Nepa* sp.	Nepa
10.	*Atractomorpha* sp.	Walking sticks
11.	*Elophila crisonalis* W.	Caseworms/larvae, leaf roller
12.	*Galerucella birmnica* J.	Singhara beetle
Mollusks/Gastropods		
13.	*Lymnaea luteola* Lamarck	Freshwater snail
14.	*Gyraulus convexiusculus* Hutton	Freshwater snail
15.	*Bellamya bengalensis* Lamarck	Freshwater snail
16.	*Gabbia orcula* Nevill	Freshwater snail

own growth. These insects are usually found in Makhana fields during the monsoon season, and their presence coincides with the breeding season of Jacanas. These species of birds along with others (e.g., herons, egrets, and lapwings) feed on these mollusks and provide protection to the plants, and benefit in turn. Given the importance of these two species of birds, it is critical to focus on strategies for their long term protection and conservation. Such an approach will benefit both the birds as well as secure the livelihoods of people. Similar observations also need to be carried out with other species, to understand the applicability of such symbiotic relationships providing multiple benefits at the grassroot level.

References

Chaudhary, J.N. & O. Prakash (2003). Economic analysis of production and marketing of Makhana in Bihar. ICAR.

Chen, T.C., Y.S. Lin & T.S. Ding (2008). Time Budget of Polyandrous Pheasant-Tailed Jacana (*Hydrophasianus chirurgus*) during Breeding Season in Taiwan". *Taiwania* 53(2): 107–115.

Cronquist, A. (1981). *An Integrated System of Classification of Flowering Plants*. Columbia University Press, New York, 111.

Eens, M. & R. Pinxten (2000). Sex-role reversal in vertebrates: behavioural and endocrinological accounts. *Behavioural Processes* 51(1–3): 135–147.

Emlen, S.T. & L.W. Oring (1977). Ecology, sexual selection and the evolution of mating system. *Science* 197: 215–223.

Grimmet, R., C. Inskipp & T. Inskipp (2016). *Birds of Indian Subcontinent 2nd edition*. Oxford University Press, Delhi, 144pp.

Jenni, D.A. (1974). Evolution of polyandry in birds. *American Zoologist* 14(1): 129–144.

Wang, J.P., Y.T. Ueng & J.J. Perng (1998). Water quality, aquatic plankton and insects in the habitat of *Hydrophasianus chirurgus*. Essays of the 4th Conference on Coastal Wetlands Ecology and Conservation 1998: 8–23.

Whittingham, L.A., F.H. Sheldon & S.T. Emlen (2000). Molecular phylogeny of jacanas and its implications for morphologic and biogeographic evolution. *The Auk* 117(1): 22–32.

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Feral Pigeon occupies the nest of House Crow in Chennai, India

Figure 1. a—*Muntingia calabura* | b—*Columba livia* and *Corvus splendens* roosting around nest | c—a pair of *Columba livia* in the nest built by *Corvus splendens* | d—female *Columba livia* incubating eggs. © M. Pandian.

Populations of *Columba livia* (Gmelin, 1789) (Aves: Columbiformes: Columbidae) are adapted to live almost worldwide, except the Sahara, Antarctica, and the higher Arctic (BirdLife International 2016). They are native to eastern Europe, southwestern & central Asia, and northern Africa (Darwin 1868); and were introduced to Australia, America, rest of the Asian countries, and to many Islands (Avibase 2007). They can live with humans in urban environments (Fitzwater 1998). They are socially monogamous and breed throughout the year. They use loose roof tiles, windows, gutters, air conditioner spaces, and building ledges as nesting sites. Their ability to adjust through behavioural modifications have enabled them to successfully adapt and colonize new and unfamiliar habitats (Shochat et al. 2010) in case they may have milder micro-climates

(Jokimaki et al. 2005) and fewer predators (Tsurim et al. 2008). High population densities of feral pigeons have been recorded on old buildings at high altitudes (Ali et al. 2013). The IUCN Red List of Threatened Species has classified *C. livia* as 'Least Concern' (Birdlife International 2016).

Although introduced, *C. livia* have integrated themselves with Indian culture and rearing them has been a popular pastime from a long time. The Mughals imported pigeons from distant countries and bred them for amusement and used them as messenger birds. At least 20,000 pigeons were maintained by Moghul Emperor Akbar (British Library 2013).

Chennai city (13.083^{0}N & 80.283^{0}E) occurs along the coast of the Bay of Bengal with a human population of c. 7 million. Coovum, Adayaru, and Kosasthalai rivers flow through the city and drain into the Bay of Bengal. The city experiences a maximum temperatures of 35–40^{0}C in May–June and a minimum of temperatures of 14^{0}C in December–January every year. The city receives most of its rainfall from north-east monsoon in October–December (Chennai 2019).

The study site was in a vacant housing plot in Bharathi Street, Korattur (13.118^{0}N & 80.193^{0}E). An abandoned nest of a House Crow *Corvus splendens* was found on a solitary tree (4m) of *Muntingia calabura* L. (Muntingiaceae) (6m high), 25cm DBH. The tree was used by 2–4 C. *splendens* for roosting. On 21 February 2019, a pair of *C. livia* visited the tree for roosting and continued to stay on the tree along with *C. splendens* for four days. On the fifth day (25 February 2019), *C. livia* female started to modify the abandoned nest by adding dry twigs and occupied the nest. *Corvus splendens* started chasing *C. livia* and the battle continued through the day. In the following days *C. livia* pair started using the abandoned nest with another individual of *C. livia* along with a pair of *C. splendens* roosting nearby. On 27 February, *C. livia* female was incubating an egg in the nest. On 1 March 2019, another egg was laid. During the day, one *C. livia* pair incubated the eggs and the other stayed close to the nest, probably guarding it (Fig. 1).

Columba livia generally prefer high-rise buildings and use available vacant spaces for building nests. Pigeon populations have, thus, become successful colonizers in urban areas. Their nesting site plasticity has been shown in Switzerland (Haag-Wackernasel & Geigenfeind 2008). Johnston & Janiga (1995) had remarked that *C. livia* are highly adaptable birds, which also use trees for nest construction. In London, two pairs of *C. livia* occupied old Woodpigeons' nests in trees and continued breeding activities. This could have been due the demolition of old buildings and construction of new type designed buildings which lack nesting sites (Godwin 1960). In the present observation, a pair of *C. livia* had used an already built and abandoned nest of *C. splendens* on the branches of *M. calabura*. The present observation suggests that *C. livia* can occupy

abandoned nests of other birds, e.g., *C. spendens*, for breeding. House Crows are known to attack pigeons and kill them (Metcalfe 2012). The behavioral change of pigeon populations by modifying their nesting behaviour from buildings to trees, resisting predatory birds, and occupying the already built nests of other species requires further study.

References

Ali, S., B.A. Rakha, I. Hussain, M.S. Nadeem & M. Rafigue (2013). Ecology of feral Pigeon (*Columba livia*) in urban areas of Rawalpindi/Islamabad, Pakistan. *Pakistan Journal of Zoology* 45(5): 1229–1234.

Avibase (2007). The world bird databse. Feral Pigeon *Columba livia* Gmelin, JF, 1789.https://avibase.bsc.eco.org. Accessed on 18 March 2019.

BirdLife International (2016). Species factsheet. *Columba livia*. Datazone.birdlife.org/species/factsheet/22690066. Accessed on 18 March 2019.

Chennai (2019). Government of Tamil Nadu website, https:// Chennai.nic.in/district-administration. Accessed on 18 March 2019.

Darwin, C. (1868). *The Variation of Animals and Plants under Domestication. Vol.1*. John Murray, London, 463pp.

Fitzwater, W.D. (1998). Solutions to urban bird problems. *Proceedings of the Thirteenth Vertebrate Pest Conference* 254–259.

Godwin, D. (1960). Comparative ecology of pigeons in inner London. *British Birds* 53(5): 209—210.

Haag-Wackernagal, D. & A.J. Geigenfeid (2008). Protecting buildings against feral pigeons. *European Journal of Wildlife Research* 54: 715–721.

Johnston, R.F. & M. Janiga (1995). *Feral Pigeons*. Oxford University Press, USA, 320pp.

Jokimaki, J., M.L. Kaisanlahti-Jokimaki, A. Sorace, E. Fernandez Juricic, I. Rodriguez-Prieto & M.D. Jimenez (2005). Evaluation of the 'safe nesting zone' hypothesis across an urban gradient: a multi-scale study. *Ecography* 28: 59–70.

Metcalfe, J. (2012). Why are not cities littered with dead pigeons. www.citylab.com. Accessed on 2 March 2019.

Shochat, E., S. Lerman & E. Fernandez-Juricic (2010). Birds in urban ecosystems: population dynamics, community structure, biodiversity and conservation. *Urban Ecosystem Ecology* 75–86.

Tsurim, I., Z. Abramsky & B.P. Kotler (2008). Foraging Behaviour of Urban Birds: Are human commensals less sensitive to predation risk that their non-urban counterparts? *The Condor* 110(4): 772–776.

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Green Skill Development Programme: A Course on Basic Ornithology and Bird Identification

A one-month course, on Basic Ornithology and Bird Identification was developed and conducted by ENVIS-RP Institute of Wildlife Sciences, University of Lucknow. This programme was funded by MoEF&CC, New Delhi. The course was conducted from 5 February to 5 March at Institute for Wildlife Sciences, ONGC Centre for Advanced Studies University of University that was attended by participants allover India.

Objectives of the GSDP Course:

- Develop an understanding about Ornithology.
- To generate qualified students who can directly get jobs in the allied fields of Ornithology.
- To generate qualified certificate holders who can be part professional organizations working in the field of conservation.
- To generate a team of field experts who can take up jobs related to the environment in educational institutions.
- Enhance learning and understanding of Birds behaviour.

The course was structured in a way where learners get opportunity for:

- Field visits to demonstrate what is learnt in the subjects.
- Expert interactions to deepen the knowledge.
- Activities show a hands-on approach to conservation.
- Peer interaction for sharing of knowledge.

About the Module

Module was envisaged to be done in two parts where one part took place at ENVIS-RP, Institute of Wildlife Sciences, University of Lucknow as teaching hub and other part was visit to Wildlife Sanctuaries, Kukrail Reserve Forests, Kudiaghat, Janeshwar Misr Park, Ram Manohar Lohia Park, Gomti River for the field exposure. At Lucknow, course was conducted at ENVIS-RP, University of Lucknow campus.

Focus of this multidisciplinary course was:

- To understand birds, conservation and management challenges at urban and rural level and how it is managed.
- To understand sustainability of birds' areas in context of habitat and management.
- To understand Global criterion and how education can be key driver for achieving goals.
- To observe Indian ornithology through various field visits and interaction with teachers and naturalists, conservationists.
- To interact with bird conservation communities in urban, rural and conserved area in Lucknow for understanding ornithology issues.
- To observe bird's status and challenges faced with conservation in the IBA around Wildlife Sanctuaries and forests areas.

The first course of GSDP was inaugurated at ENVIS-RP, University of Lucknow by the chief guest Hon'ble Vice Chancellor Prof.

Alok Kumar Rai, University of Lucknow and Director Prof. U.N. Dwivedi, ONGC Centre for Advanced Studies, University of Lucknow by enlighten the lamp and Sarasvati vandana. The inaugural lecture was delivered by Dr. Asad R. Rahmani on Basic Bird Identification and Dr. Rajat Bhargava BNHS.

Inauguration of Course by Chief Guest Hon'ble Vice Chancellor Prof. Alok Kumar Rai, University of Lucknow.

Some of the major topics covered in the course are: bird migration, ringing and breeding of birds, Food and Foraging, Census methods (at Kudiaghat Gomti River, Lucknow), creating checklist of water birds, Bird photography and basics of camera, binocular, GIS remote sensing, avian mating and social behaviour, bird population, vocal behaviour and habitat ecology of birds, habitats and bird communities, taxonomy,

Participants during the field activity and survey.

The course also included field trips to Gomtinagr River bank, kudiyaghat, Janeshwar Mishr Park, Ram Manohar Lohia, Lucknow Zoo, Nawabganj Bird Sanctuary and Kukrail Reserve Forests, and also to villages adjacent to the protected areas to interact with the local communities.

At last day all the participants presented their field related works and reports. The participants were facilitated by certificates by chief guest Mrs. Preeti Gangwar, IFS. Prof. A.K. Pandey, Scientist NBFGR, Dr. V.P. Singh, IITR, Prof. A.K. Sharma, Prof. Madhu Tripathi and Prof. Padma Saxena from Department of Zoology were also present. Participants were shared their experiences and knowledge which was gained the course.

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International Otter Survival Fund WORLD OTTER DAY
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A new year and a new decade is upon us and what a great time to put some thoughts together and plan what YOU want to do to support IOSF's 2020 #WorldOtterDay.

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All 13 otter species worldwide are still listed on the Red List of Threatened Species and we continue to work hard to bring about changes, in particular with regard to the illegal trade for fur and pets, as well as other challenges that otters face in many countries such as environmental impact of habitat loss and the dangers of roads.

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- To do a fundraiser
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- Raise awareness with posters about otters
- Post your support on social media using the all important #WorldOtterDay
- Present your research to fellow students and/or colleagues
- Hold an otter art competition.

The list is as endless as your imagination, so let it go and encourage as many other people as you can, to take part.

We want to know what you are going to do, so please tell us and we will add your #WorldOtterDay event to our world map, which we will be updating regularly (click here or on the map below to view). Just email Ben@otter.org

There are resources available to download from our website for participants to use some of which are being updated, so look out for changes as they happen. You will find these on our Media/Resources pages here

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Join health professionals, conservation organizations, celebrities, and others in a global movement to call on our world's governments to permanently end the commercial trade and sale in markets of wild terrestrial animals, for consumption, worldwide. Together we are urging the world's governments to recognize that this is among the most important decisions that the global community can make to prevent future pandemics and global disruption. Every voice counts.

ZOO'S PRINT

Communicating science for conservation

ZOO'S PRINT Publication Guidelines

We welcome articles from the conservation community of all SAARC countries, including Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka and other tropical countries if relevant to SAARC countries' problems and potential.

Type — Articles of semi-scientific or technical nature. News, notes, announcements of interest to conservation community and personal opinion pieces.

Feature articles — articles of a conjectural nature — opinions, theoretical, subjective.

Case reports: case studies or notes, short factual reports and descriptions.

News and announcements — short items of news or announcements of interest to zoo and wildlife community

Cartoons, puzzles, crossword and stories

Subject matter: Captive breeding, (wild) animal husbandry and management, wildlife management, field notes, conservation biology, population dynamics, population genetics, conservation education and interpretation, wild animal welfare, conservation of flora, natural history and history of zoos. Articles on rare breeds of domestic animals are also considered.

Source: Zoos, breeding facilities, holding facilities, rescue centres, research institutes, wildlife departments, wildlife protected areas, bioparks, conservation centres, botanic gardens, museums, universities, etc. Individuals interested in conservation with information and opinions to share can submit articles ZOOS' PRINT magazine.

Manuscript requirements
Articles should by typed into a Word format and emailed to zooreach@zooreach.org. Avoid indents, all caps or any other fancy typesetting. You may send photos, illustrations, tables.

Articles which should contain citations should follow this guideline: a bibliography organized alphabetically and containing all details referred in the following style: surname, initial(s), year, title of the article, name of journal, volume, number, pages.

Editorial details
Articles will be edited without consultation unless previously requested by the authors in writing. Authors should inform editors if the article has been published or submitted elsewhere for publication.

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ZOO'S PRINT magazine is informal and newsy as opposed to a scientific publication. ZOO'S PRINT magazine sometimes includes semi-scientific and technical articles which are reviewed only for factual errors, not peer-reviewed.

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