ZOO'S PRINT

Communicating Science for Conservation

© Abdullah Khan

ISSN 0971-6378 (Print); 0973-2543 (Online)
Vol. XXXV, No. 10 October 2020

Magazine of Zoo Outreach Organization
www.zoosprint.zooreach.org

ZOO'S PRINT

Communicating science for conservation

Vol. XXXV, No. 10, October 2020 ISSN 0971-6378 (Print); 0973-2543 (Online)

Contents

New records of bats in Nepal's Shuklaphanta National Park

Painted Bat

The Shuklaphanta National Park (ShNP) was established as a wildlife reserve in 1976 and later declared as national park in 2017. The area is located at the southwestern corner of Nepal in Terai and Shivalik physiographic zones of Kanchanpur District. It lies between 28.763–29.047 N latitudes and 80.095–80.361 E longitudes. The altitude ranges 175–1,300 m (Poudyal et al. 2019).

With an area of 305km^2, the ShNP supports a wide range of biodiversity. The forests cover about 60% of the park area, grasslands for which the park is especially well-known, covering 27% of the park, and wetlands including rivers, streams, small lakes, and marshlands covering about 10% of the park (Poudyal et al. 2019). The national park boasts a high total of 24 species of fish, 15 species of amphibians, 56 species of reptiles, 450 species of birds, and 56 species of mammals (DNPWC 2003; Poudyal & Chaudhary 2019; Poudyal et al. 2019; Rawat et al. 2020). Other animal taxa in the park are poorly studied.

The bat species are the scantily documented mammalian species in ShNP. Indian Flying Fox *Pteropus medius*, Greater Short-nosed Fruit Bat *Cynopterus sphinx*, and Greater Asiatic Yellow House Bat *Scotophilus heathii* were recorded in Kanchanpur District in the periphery of the park (Chaudhary & Ghimire 2010; Acharya 2015); however, there were no evidences of these species found inside the park until 2016. Later, some opportunistic

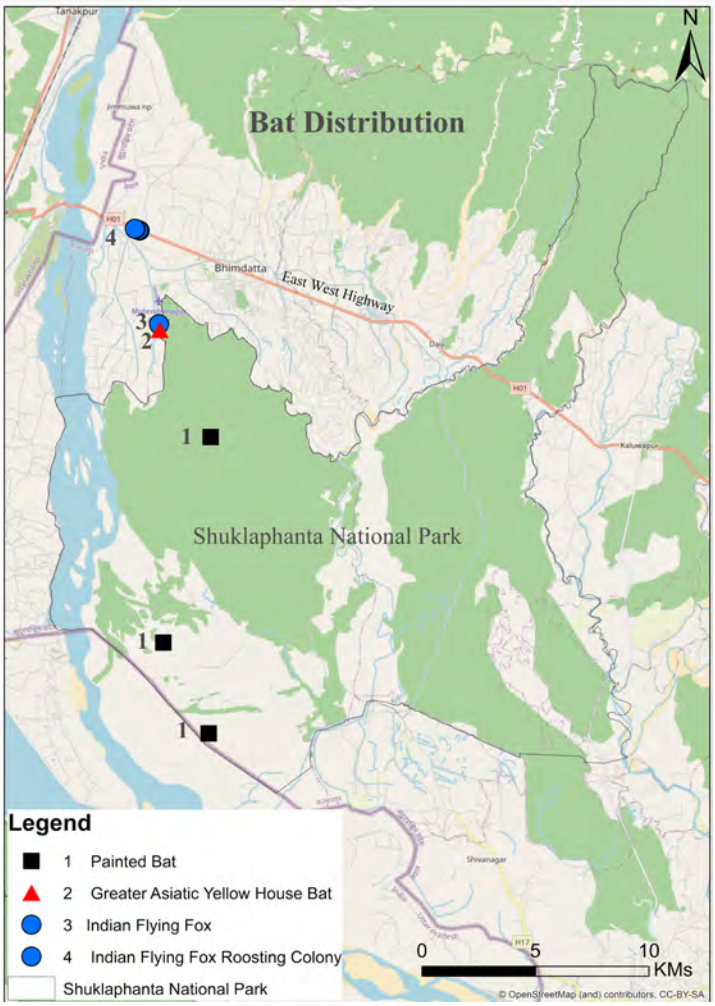


Fig 1. Map showing recorded points.

Greater Asiatic Yellow House Bat.

sighting and photographs were taken. We confirmed photographic records of three bat species, i.e., Greater Asiatic Yellow House Bat, Indian Flying Fox, and Painted Bat *Kerivoula picta* inside the park area during 2016–2020. The record is based on photographs via sighting in different period and camera trap survey conducted for tiger and its prey base in 2016 (Fig. 1).

1. Greater Asiatic Yellow House Bat *Scotophilus heathii* (Horsfield, 1831)

The opportunistic sighting of the species was obtained for the first time near Majhgaon area at the park headquarters (chief warden's residence) on 19 May 2019 at night 22.00h and photographed the next morning (Poudyal et al. 2019); inveterate the first locality record inside the park. The species skull was badly exposed, might be it has survived from a terrible accident.

2. Painted Bat *Kerivoula picta* (Pallas, 1767)

Painted Bat was photographed at three locations in three different

occasions (18.14, 19.41 & 02.28 h on 23 & 24 October, & 11 December) from the western part of the park (Shuklaphanta grassland and associate forest areas) during the camera trapping survey in 2016 (Poudyal et al. 2019). This was second locality record in Nepal and the first record from ShNP. Myers et al. (2000) had provided the first locality record of this species from Chitwan, Nepal on 17–18 March 1990.


Indian Flying Fox.

3. Indian Flying Fox *Pteropus medius* (Brünnich, 1782)

In the evening of 1 September 2020, a few cauldron of Indian Flying Foxes were noticed opportunistically at the park office premises foraging on Asoka *Saraca asoca* fruits; consuming flesh and juice, and spitting out seeds and pulp. We documented this as first locality record in the park. Next evening, 19.12–19.20 h, a big cauldron of around 72 individuals was counted flying towards the Asoka garden near park headquarter for forage. Acharya (2015) had explored a roosting colony of 385 individuals at Sukasal in the western part of Kanchanpur District 4km north from Majhgaon. The same colonial area was visited in the morning (06.30–07.35 h) of 4 September 2020 and counted 1698 individual roosting in four Silk Cotton Trees *Bombax ceiba* alongside the east-west highway at Bhimdutta Municipalty ward no 5. Some photographs of the


Indian Flying Fox colony

species including a video of a copulating pair was obtained.

Recommendation

Priority on wildlife conservation in Nepal has been focused on only large mammals (Heinen & Yonzon 1994) hence very less research regarding bats and other mammalians have been conducted. The update of the bat species from the western part of Nepal is scanty and unexplored. We strongly recommend the research based documentation, ecology, and habitat preference of bat species from western part of Nepal including ShNP.

References

Acharya, P.R. (2015). *Conservation Initiatives for Fruit Bats in Nepal*. Update report submitted to Rufford Small Grant Foundation.

Chaudhary, P. & R. Ghimire (2010). First phase study of Bats in Far-western development region, Nepal. *Small Mammal Mail* 2(2): 37–39.

DNPWC (2003). Royal Shuklaphanta Wildlife Reserve Management Plan. Department of National Parks and Wildlife Conservation, Kathmandu, 18pp.

Heinen, J.T. & P.B. Yonzon (1994). A review of conservation issues and programs in Nepal: From a single species focus toward biodiversity protection. *Mountain Research and Development* 14(1): 61–76.

Myers, P., J.D. Smith, H. Lama, B. Lama & K.F. Koopman (2000). A recent collection of bats from Nepal, with notes on *Eptesicus dimissus*. *Zeitschriftfür Säugetierkunde* 65(3): 149–156.

Poudyal, L.P. & H. Chaudhary (2019). *Birds of Shuklaphanta National Park*. Shuklaphanta National Park Office and Nepalese Ornithological Union, Kanchanpur and Kathmandu, Nepal, 155pp.

Poudyal, L.P., B.R. Lamichhane, U. Paudel, S.R. Niroula, A. Prasai, S. Malla, N. Subedi, K. Thapa & B.R. Dahal (2019). *Mammals of Shuklaphanta: An Account from Camera Trap Survey*. Shuklaphanta National Park Office, Kanchanpur, Nepal, 78pp.

Rawat, Y.B., S. Bhattarai, L.P. Poudyal & N. Subedi (2020). Herpetofauna of Shuklaphanta National Park, Nepal. *Journal of Threatened Taxa* 12(5): 15587–15611. https://doi.org/10.11609/jott.5611.12.5.15587-15611

Acknowledgements: We are very much grateful to ShNP for providing animal photographs captured during the camera trap survey 2013-2018; Hari Basnet and Sanjan Thapa for identifying the bat species; and Devraj Joshi for providing photographs and information on colonial area of Indian Flying Fox.

Laxman Prasad Poudyal[1], Yam Bahadur Rawat[2] & Puran Dev Mishra[3]
[1-3] Shuklaphanta National Park Office, Majhgaon, Kanchanpur, Nepal.
Email: [1]laxpoudyal@gmail.com (corresponding author), [2]yamrawat0000@gmail.com, [3]mishrapurandev5@gmail.com

Citation: Poudyal, L.P., Y.B. Rawat & P.D. Mishra (2020). New records of bats in Nepal's Shuklaphanta National Park. Small Mammal Mail #428, In: *Zoo's Print* 35(10): 01–04.

Chinese Pangolin: struggle for existence in Assam, India

Chinese Pangolin (© Koushik Rajbongshi).

Pangolin is one of the unique and evolutionary distinct creatures belongs to the genus *Manis* Linnaeus, (1758) and is derived from Malayan phrase “Pen Gulling” meaning “rolling ball” (Thapa et al. 2014). There are two species of pangolins found in India, namely, Chinese Pangolin *Manis pentadactyla* and Indian Pangolin *Manis crassicaudata*. Although the two species are similar morphologically, the Indian Pangolin is relatively larger than the Chinese Pangolin and has 11–13 rows of scales across the back compared with 15–18 rows in the Chinese Pangolin (Mohapatra et al. 2015). The presence of protective ear-flaps in Chinese Pangolin is one of the major anatomical differences between the two pangolin species (Wu et al. 2020).

The Chinese Pangolin is distributed throughout the northeastern states of India and in Bangladesh, Bhutan, Nepal, Myanmar, China, Lao PDR, Taiwan, Thailand, and Vietnam (Challender et al. 2014). It occupies a wide range of habitats, including primary and secondary forest, tropical forests, limestone forests, mixed coniferous, broadleaf forests, low mountain or hill forest, bamboo forest, grassland, and agriculture field (Wu et al. 2020).

Chinese Pangolin is a solitary night feeding mammal that predominantly depends on 23 species of ant and 12 species of termite (Wu et al. 2020). It is estimated that an adult

Distribution of Chinese Pangolin. Source: The IUCN Red List of Threatened Species (Challender et al. 2019).

pangolin consumes more than 70 million insects annually (IUCN Pangolin Specialist Group) and maintaining ant and termite levels in forest and agricultural field.

However, in recent decades, there has been a notable rapid decline in the global population of Chinese Pangolin due to hunting, poaching, and habitat destruction. Scales of Chinese Pangolin are used as an ingredient in traditional medicine and their meat is considered a delicacy (as a protein source) in southeastern and eastern Asian countries and it has become the most trafficked wild mammal in the world (Thapa et al. 2014; D'Cruze et al. 2018). The true extent of extraction of Chinese Pangolin throughout their range is unknown, but it has been estimated that over 50,000 individuals were taken from the wild between 2000 and 2013 (Challender et al. 2015). Due to rampant population decline, it has been driven to the edge of extinction and IUCN (International Union for Conservation of Nature, 2014) listed it as a Critically Endangered species on The IUCN Red List of Threatened Species (Challender et al. 2019). Simultaneously, it was categorized in CITES Appendix I (Convention on International Trade in Endangered Species of Wild Fauna and Flora 2016).

In the context of Assam, northeastern India, Chinese Pangolin is known as Bonrui. Information on population status in the wild is largely unknown, however, it has been reported from Manas National Park (Sarma et al. 2015; Lahkar et al. 2018), Patharkandi Reserve Forest (Talukdar & Choudhury 2017), Assam University campus (Mazumdar et al. 2011), Baksha (Pathak 2019), Digboi (Sarma et al. 2015), Dima-Hasao (D'Cruze et al. 2018).

In the state, Chinese Pangolin is believed to be good luck charms, on the other hand, some considered as superstitiously a bad omen if sighted. This species is in the high threats by anthropogenic activities such as hunting, poaching, deforestation, rampant economic development, agricultural practices and transportation development activities significantly affect their survival and reproductive success.

The international trade figure suggested that the entire north-east is under severe hunting pressure (Heinrich et al. 2016). Local communities are involved in the hunting of Chinese Pangolin for personal and commercial gain. In Barak Valley, Assam, Chinese Pangolin is hunted as bushmeat and scales are used in traditional primary health care practices (Dattagupta et al. 2014). Rural

hunters, belonging to the Biate, Dimasa, and Karbi tribes in Dima-Hasao District, largely kill pangolins for their scales and each hunter captured one pangolin per year with the potential to earn 9,000 INR for a single animal (D'Cruze et al. 2018). Also, they are considering pangolin meat as medicine for piles, malaria, and disease related to the nervous and digestive system (D'Cruze et al. 2018). Increasing demand is driven by wet markets (where live animals and freshly slaughtered meat are sold, and so named because of the large quantities of water used to slosh the floors) of southeastern Asian countries; international trade, and to a lesser extent, the domestic trade of pangolins has rapidly risen in Assam. The WIRE news Dated 07.ix.2019, Wildlife Crime Control Bureau (WCCB) in Assam has seized 10 live pangolins in the last three years from northeastern Indian states. It was pointed out that the smuggling of Rhino horns and Tiger parts from India to China has led to a drop in smuggling by enhanced security and international spotlight on the trafficking, but that has been replaced by a surge in the trafficking of smaller species like Chinese Pangolins and geckos (Sharma 2019).

The emergence of new zoonotic diseases in the last century reflected the encroachment of human activities into forests and of the consequent disruption of local ecologies, including dramatic changes in the ecology of viruses and their hosts (Volpato et al. 2020). The world today is dealing with the outbreak of COVID-19 originating from Wuhan Province of China in December 2019, and spreading over 210 countries worldwide (Sarkar et al. 2020). A group of scientists from China explored potential intermediate hosts of SARS-CoV-2, the virus that causes Covid-19; they found genomic and evolutionary evidence of the occurrence of a SARS-CoV-2 in dead Malayan pangolins where the result is 91.02% identical to SARS-CoV-2 (Zhang et al. 2020). It is assumed that the wet markets of China can be the possible origin of the COVID-19 that largely increased contact between different species of wild animals, and between them and humans. In the wake of the COVID-19 pandemic, the Chinese government has shut down wet markets all over the country with enhancing the protection for pangolins and illicit wildlife trade. The banning of wet markets without driving down the demand for wild meat, may felicitate the trade to move underground, with a potentially even worse impact on commercialized species like the Chinese Pangolin. However, whether pangolin species are the good intermediate host for SARS-CoV-2 is still under debate.

This ecologically important species has received less scientific attention and their ecology, behaviour, status, and distribution are relatively not known. There is an urgent need to evaluate the distribution and habitat status of Chinese Pangolin in Assam because a clear distribution is a prerequisite for initiating conservation of any species. Also, there is necessary to assess the socio-perspective of local communities and hunters on conservation of Chinese Pangolin to introduce community-based conservation action plans which include grass-root activities that bring local community,

governmental departments, and other organizations to work together in a common platform towards achieving conservation of Chinese Pangolins in Assam.

References

Challender, D., C. Waterman & J. Baillie (2014). Scaling up pangolin conservation. IUCN SSC Pangolin Specialist Group Conservation Action plan. Zoological Society of London.

Challender, D.W.S., S.R. Harrop & D.C. MacMillan (2015). Understanding markets to conserve trade threatened species in CITES. *Biological Conservation* 187: 249–259. https://doi.org/10.1016/j.biocon.2015.04.015

Challender, D, S.B. Wu, P. Kaspal, A. Khatiwada, A. Ghose, N. Ching-Min Sun, R.K. Mohapatra, T. Laxmi Suwal (2019). *Manis pentadactyla* (errata versionpublished in 2020). The IUCN Red List of Threatened Species 2019: e.T12764A168392151. [Downloaded 2020 October 20]. https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T12764A168392151.en.

Dattagupta, S., A. Gupta & M. Ghose (2014). Diversity of non-timber forest products in Cachar District, Assam, India. *Journal of Forestry Research* 25: 463–470. https://doi.org/10.1007/s11676-014-0477-7

D'Cruze, N., B. Singh, A. Mookerjee, L.A. Harrington & D.W. Macdonald (2018). A socio-economic survey of pangolin hunting in Assam, Northeast India. *Nature Conservation* 30: 83–105. https:// doi.org/10.3897/natureconservation.30.27379

Heinrich, S., T.A. Wittmann, T.A. Prowse, J.V. Ross, S. Delean, C.R. Shepherd & P. Cassey (2016). Where did all the pangolins go? International CITES trade in pangolin species. *Global Ecology and Conservation* 8: 241–253. https://doi.org/10.1016/j.gecco.2016.09.007

Lahkar, D., M.F. Ahmed, R.H. Begum, S.K. Das, B.P. Lahkar, H.K. Sarma & A. Harihar (2018). Camera-trapping survey to assess diversity, distribution and photographic capture rate of terrestrial mammals in the aftermath of the ethnopolitical conflict in Manas National Park, Assam, India. *Journal of Threatened Taxa* 10(8): 12008–12017. http://doi.org/10.11609/jott.4039.10.8.12008-12017

Mazumdar, K., R. Soud & A. Gupta (2011). Mammalian diversity of degraded forest habitats around Assam University campus, Cachar, Assam, India, with notes on conservation status. *Our Nature* 9: 119–127. https://doi.org/10.3126/on.v9i1.5742

Mohapatra, R.K., S. Panda, M.V. Nair, L.N. Acharjyo & D.W. Challender (2015). A note on the illegal trade and use of pangolin body parts in India. *Traffic Bulletin* 27(1): 33–40.

Pathak, K.D. (2019). Assam; Chinese Pangolin rescued by villager in Baksa, released in Dihira forest. https://nenow.in/north-east-news/assam/assam-chinese-pangolin-rescued-by-villager-in-baksa-released-in-dihira-forest.html. Electronic version accessed 18 September 2020.

Sarkar, P., N. Debnath & D. Reang (2020). Coupled human environment system amid COVID-19 crisis: A conceptual model to understand the nexus. *Science of the Total Environment* 141757. https://doi.org/10.1016/j.scitotenv.2020.141757

Sarma, K., A. Sangma & P.B. Saikia (2015). Tracking the scaly anteaters: status survey of Chinese Pangolin in Manas Biosphere Reserve, Assam, India. Rufford. https://www.rufford.org/files/9282-1%20Mid%20Year%20Report_0.pdf

Sharma, A. (2019). Assam: Pangolin smuggling to China surges after rhinos and poaching declines. https://thewire.in/environment/assam-rhino-pangolin-smuggling-china Electronic version accessed 18 September 2020.

Talukdar, N.R. & P. Choudhury (2017). Conserving wildlife wealth of Patharia Hills reserve forest, Assam, India: A critical analysis. *Global Ecology and Conservation* 10: 126–138. https://doi.org/10.1016/j.gecco.2017.02.002

Thapa, P., A.P. Khatiwada, S.C. Nepali & S. Paudel (2014). Distribution and conservation status of Chinese Pangolin (Manis pentadactyla) in Nangkholyang VDC, Taplejung, Eastern Nepal. *American Journal of Zoological Research* 2: 16–21. https://doi.org/10.12691/ajzr-2-1-3

Volpato, G., M.F. Fontefrancesco, P. Gruppuso, D.M. Zocchi & A. Pieroni (2020). Baby pangolins on my plate: possible lessons to learn from the COVID-19 pandemic. *Journal of Ethnobiology and Ethnomedicine* 16: 19. https://doi.org/10.1186/s13002-020-00366-4

Wu, S., N.C.-M. Sun, F. Zhang, Y. Yu, G. Ades, T.L. Suwal & Z. Jiang (2020). Chinese pangolin *Manis pentadactyla* (Linnaeus, 1758), pp. 49–70. *Pangolins.* Elsevier. https://doi.org/10.1016/B978-0-12-815507-3.00004-6

Zhang, T., Q. Wu & Z. Zhang (2020). Probable pangolin origin of SARS-CoV-2 associated with the COVID-19 outbreak. *Current Biology* 30: 1346–1351. https://doi.org/10.1016/j.cub.2020.03.022

Acknowledgements: The author is thankful to Dr. Arun Jyoti Nath, Department of Ecology and Environmental Science, Assam University Silchar, for his valuable suggestions and help.

Animekh Hazarika
Department of Ecology and Environmental Science, Assam University, Silchar, Assam 788011, India.
Email: animekhhazarika@yahoo.in

Citation: Hazarika, A. (2020). Chinese Pangolin: struggle for existence in Assam, India. Small Mammal Mail #429, In: *Zoo's Print* 35(10): 05–08.

Agapetes smithiana Sleumer var. *smithiana* -- a threatened plant on the verge of extinction

Populations of *Agapetes smithiana* Sleumer var. *smithiana* (Ericaceae: Vaccinioideae) are decreasing day by day in their natural habitats since its discovery by Gammie (1892) from Lachung Valley in Sikkim. The taxon is endemic to the eastern Himalaya of India (Sikkim & Darjeeling of West Bengal), Nepal, and Bhutan (Ghosh & Mallick 2014). Currently, the taxon is survived by a single to six individual plants in their natural habitats in Sikkim (Versay WS: Singh 2002–based on herbarium specimen by P. Singh 24981 at BSHC; Damthang: Sahu 2004 - based on herbarium specimen by A.K. Sahu 26669 at BSHC); West Bengal (Lower Tonglu in Darjeeling: Chamberlain 1975– based on herbarium specimen by D. Chamberlain 49 at DD and one reference (Panda & Reveal 2012); Nepal (an unknown locality under Eastern Nepal: H. Hara in (Hara et al. 1982) and Bhutan (Chhukha District: D.G. Long & S.J. Rae in A.J.C. Grierson & D.G. Long, 1991 and Trongsa District (Hara 1971). Based on herbarium consultations and field visits, present work provides its field description, distribution, current status and conservation aspects along with live images.

Agapetes smithiana Sleumer was first described by William Wright Smith (1911) based on specimens collected by George Alexander Gammie in 1892 as *Pentapterygium sikkimense* W.W.Sm. from Lachung Valley in the state of Sikkim. After Gammie, this species was collected by Charles Gilbert Rogers in 1899 from the lower Tonglu region of Darjeeling Himalaya in the state of West Bengal, India. Since Rogers collection (1899), no further collections were made for long time until Chamberlain (1975) who collected from Dilpa of lower Tonglu Valley. Following Chamberlain, Singh (2002: herbarium data), Sahu (2004: herbarium data), and Panda (2011: herbarium data) collected and reported this species from different localities of Sikkim and Darjeeling Himalaya, respectively. Hara (1982) reported from a locality under eastern Nepal based on his collection of two fruiting materials deposited at Tokyo University Herbarium (TI 6300562 & 6300563, fr). Hara (1971) also reported from Chendebi-Tashiling area in Trongsa district of Bhutan based on his collection in 1967 at an altitude of about 2300m. D.G. Long & S.J. Rae (1991) in A.J.C. Grierson & D.G. Long reported from Chukka District (north of Jumudag) of Bhutan based on their collections.

Agapetes smithiana Sleumer var. ***smithiana*** in *Bot. Jahrb. Syst*. 70: 106. 1939; Panda & Reveal, *Phytoneuron* 2012–8: 2. 2012. *Pentapterygium sikkimense* W.W.Sm. in *Rec. Bot. Surv. India* 4: 268. 1911. Type:

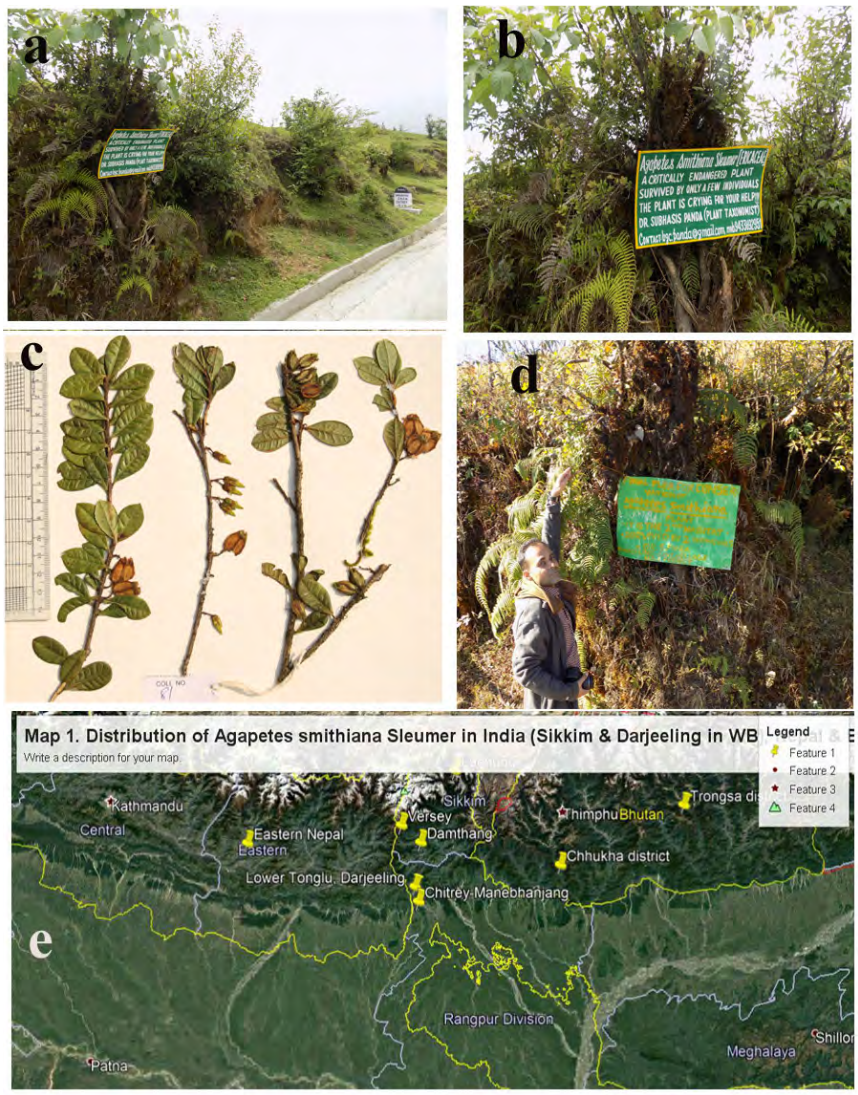


Image 1. *Agapetes smithiana* Sleumer var. *smithiana*: a–d—Chitrey-Manebhanjang-lower Tonglu population, Darjeeling | a—epiphytic Habit on *Quercus* tree trunk | b—twigs and branches | c—close-up of twigs showing flowers and fruits | d—putting awareness board in front of habit | e—distribution map.

India, Sikkim Himalaya, Lachung Valley, 7500 ft, 14.09.1892, *G.A. Gammie 1216* (lectotype: K!barcode no. K000729429).

Usually epiphytic dwarf shrub on tree trunks, 0.1–1m long. Stems rigid, terete, lenticellate, sparsely strigose-hispid; branches. Leaves compactly 2–3-stichous, 2–10 mm apart, coriaceous, subsessile; petioles 1–3 mm long, puberulous. Inflorescence cauline, 1–4-fascicled in a corymb. Flowers 12–16 mm long including pedicels with bract and bracteoles; pedicels greenish-pink, sparsely hirtellous, 4–5 mm long. Calyx campanulate, winged, light green with pinkish wings, persistent in fruits. Corolla greenish-yellow, tubular, 10–13 × 4 mm, 3.5–4.5 mm diam., glabrous. Stamens 10, encircling the pistil, distinct, 8–8.5 mm long; filaments slightly adnate to ovary disc. Pistil ca. 12 mm long. Fruit a berry, ovoid, 12–16 × 10–12 mm, light green (immature) to white (mature), glabrous, with an accrescent, winged calyx.

Distribution*:* Endemic to eastern Himalaya of India (Sikkim and Darjeeling), eastern Nepal, and Bhutan.

Flowering: April–early September; December.

Fruiting: July–August; December–January.

Habit: Epiphytic on tree trunks or rarely in rock crevices.

Habitat: Subtropical-temperate forests at altitudes ranging from 2,300–2,650 m.

Specimens examined: 24981 (BSHC), 18.v.2002, India, Sikkim Himalaya, Chitrey to Uttarey, coll. P. Singh; Damthang, 2,133–2,438m, ii.2004, coll. A.K. Sahu; 26669 (BSHC: fl.). West Bengal, Darjeeling, 3km

NW of Chitrey, along Sandakphu Trek route, 2,650m, 27.135 N & 88.167 E, 11.xii.2011, S. Panda 81 (CAL!); below Tonglu at Dilpa, 2,530m, 02.iv.1975, D. Chamberlain 49 (DD).
Local name: *Chara-ko-khorsanejato-pahelo* (Nepalese of Manebhanjang, Chitrey & Lamedura).
Notes: Author assumes Lower Tonglu population near Dilpa collected by Chamberlain (1975) may be similar to Chitrey population collected by Panda (2011) as both possessing nearly same altitude and 'Dilpa' basti is located about 1 km down of Chitrey toward Nepal side (Dilpa is located under Elam district in Nepal).

Conservation status: As a result of detailed herbarium consultations in different Indian herbaria as well as extensive field visits in Darjeeling (2011–2018) and Sikkim (2000–2004; 2007) Himalaya, currently four smaller populations were traced in Indian eastern Himalaya, viz., Versey (Chitrey-Uttarey route) in West Sikkim, Damthang in South Sikkim, Dilpa-Lower Tonglu and Chitrey in Darjeeling. Unfortunately, no further collections were made from the Lachung valley (type locality) in Sikkim after Gammie (1892). Populations of Chhukha and Trongsa districts in Bhutan showed a few individual plants epiphytic on tree trunks (D.G. Long & S.J. Rae 1991). Nepal populations collected by Hara (deposited in TI-Tokyo University Herbarium) also showed the smaller populations survived by only two individual plants epiphytic on tree trunks. The author put up a board in front of Chitrey population of Darjeeling in 2014 and 2019 to create awareness among the local Nepalese for conservation. The taxon is not assessed yet as per the IUCN Red List of Threatened Species (2019), but the taxon will qualify as Critically Endangered based on Criteria A [A4c], B [B2,b,c] and D [<50 in each population based on field visit and herbarium consultation].

References

Ghosh, D.K. & J. Mallick (2014). *Flora of Darjeeling Himalayas and Foothills (Angiosperms).* Bishen Singh Mahendra Pal Singh, Dehra Dun, 191–192pp.
Hara, H. (1971). *The Flora of Eastern Himalaya, 2nd Report*. Tokyo University Press, Tokyo, Japan, 94pp.
Hara, H., A.O. Charter & L.H.J. Williams (1982). *An Enumeration of the Flowering Plants of Nepal - Vol. 3*. Trustees of British Museum (Natural History), London, 54pp.
IUCN Standards and Petition Committee (2019). Guidelines for using the IUCN Red List Categories and criteria: version 14. IUCN, Gland, Switzerland. (http://www.iucnredlist.org/documents/RedListGuidelines.pdf)
Long, D.G. & S.J. Rae (1991). *Ericaceae*. In: Grierson, A.J.C. & D.G. Long (ed.). *Flora of Bhutan*, Vol. 2, Part 1, Royal Botanic Garden, Edinburgh, 401pp.
Panda, S. & J.L. Reveal (2012). A step-two lectotypification and epitypification of *Pentapterygium sikkimense* W.W. Sm. (Ericaceae) with an amplified description. *Phytoneuron* 2012-8: 1–7.
Sleumer, H. (1939). *Revision der Ericaceen von Neu-Guinea - I. Die papuasisch-ozeanischen Arten der Gattung*. *Agapetes* D. Don, *Botanische Jahrbucherfur Systematik* 70: 95–106.
Smith, W.W. (1911). Some additions to the flora of the eastern Himalaya: Order Vacciniaceae. *Records of the Botanical Survey of India* 4: 261.

Acknowledgements: Author is grateful to the herbarium-in-charges of Indian herbaria (CAL, DD, BSHC) for their permission to consult herbarium specimens, to Dr. P. Lama, officer-in-charge of Darjeeling Government College and to Dr. Subhasis Dutta, principal of Maulana Azad College for their kind permission to conduct this work.

Subhasis Panda
Angiosperm Taxonomy & Ecology Laboratory, Department of Botany, 8, Rafi Ahmed Kidwai Road, Maulana Azad College, Kolkata, West Bengal 700013, India.
Email: bgc.panda@gmail.com

Citation: Panda, S. (2020). *Agapetes smithiana* Sleumer var. *smithiana* -- a threatened plant on the verge of extinction. Plantasia #21, In: *Zoo's Print* 35(10): 09–11.

Trophy hunting impacts on Kashmir Markhor and changing the negative perception of local communities about wildlife in Chitral District, Pakistan

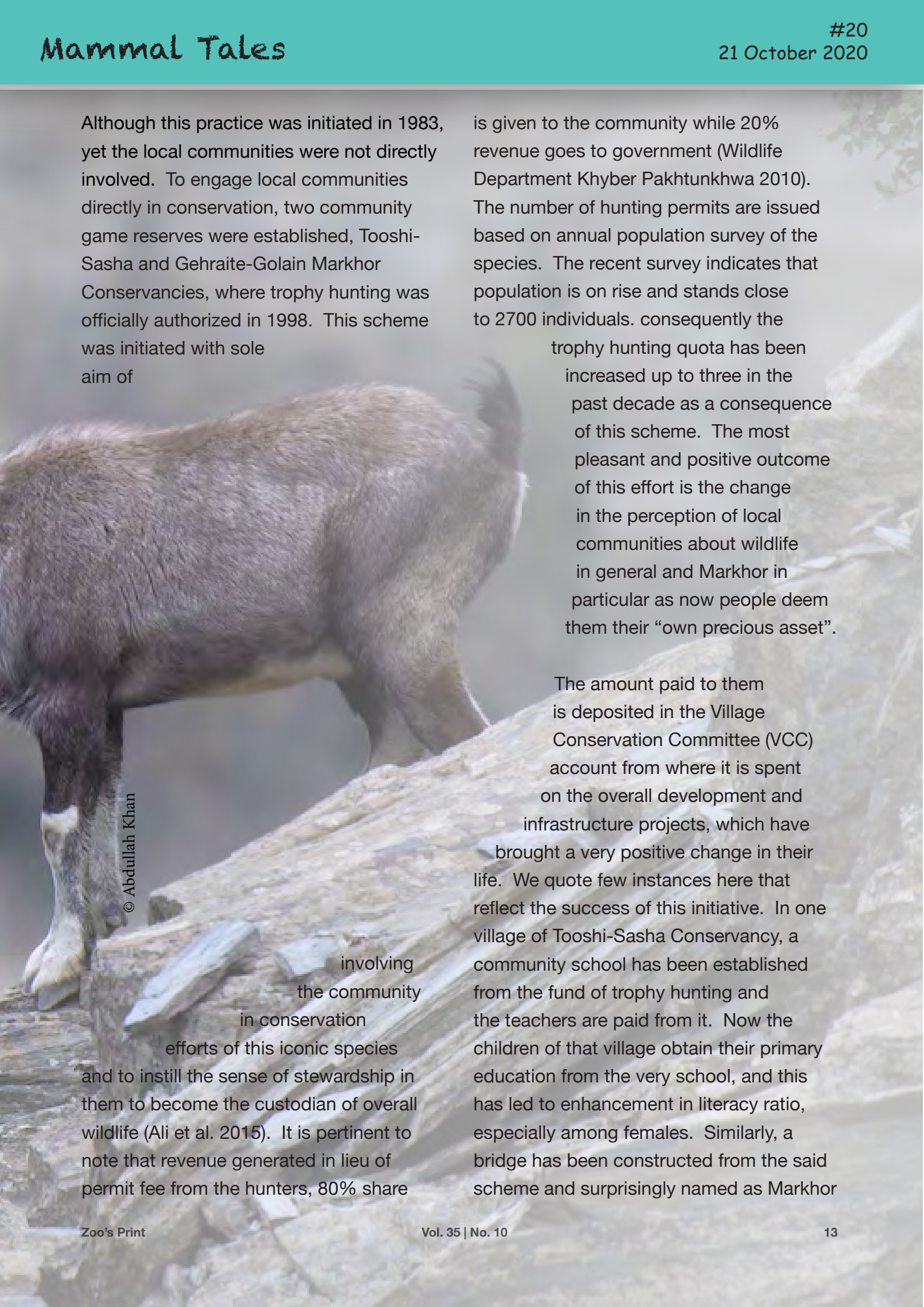
The diversity of wild flora and fauna across multiple landscapes is vast and stark variation exists owing to a diverse set of climatic conditions in Pakistan. Mainly, northern flanks of Pakistan are considered biodiversity hotspots as they harbor an array of iconic mammalian species, including Markhor *Capra falconeri*, Blue Sheep *Psuedis nayaur*, Himalayan Brown Bear *Ursus arctos*, Himalayan Ibex *Capra* sibirica, and Snow Leopard *Panthera uncia* (Khan & Baig 2020). This species richness is attributed to the variation in natural habitats ranging from dry temperate forests to alpine and sub-alpine meadows (Baig & Al-Subaiee 2009). Most of these species are pivotal from a conservation perspective as their existence is an indicator of a healthy ecosystem, and this factor enhances manifold when the fragile landscape of this part of the world is under consideration.

Among these iconic taxa, Kashmir Markhor *Capra falconeri cashmeriensis* is one such species of conservation focus as it is threatened for survival and classified as “Near threatened” by IUCN (Michel & Rosen 2016). It is facing many anthropogenic pressures akin to overgrazing leading to habitat degradation, habitat fragmentation as a result of infrastructure projects coupled with climate change. These factors are proving fatal to the survival of this magnificent species in the longterm. Along with these, one of the significant threats for Markhor was poaching by the local communities.

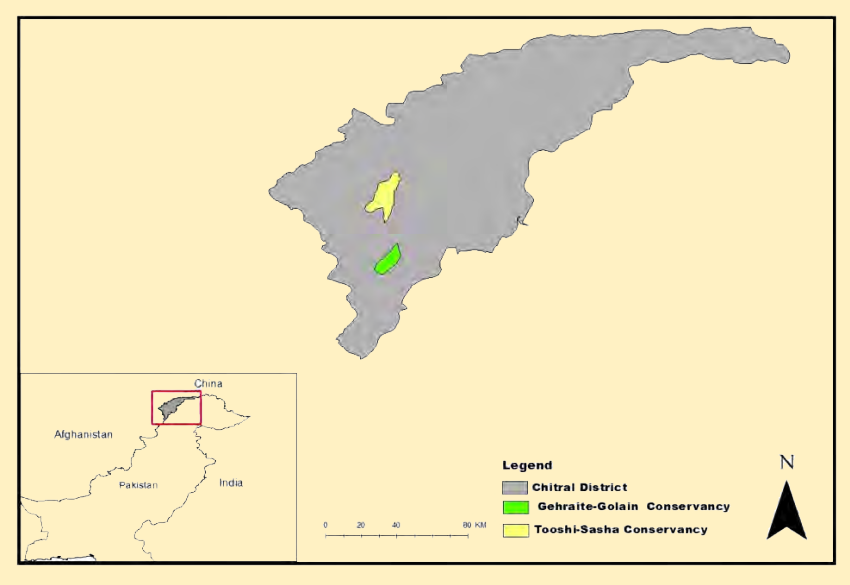
The government and other NGOs working for the protection and preservation of natural resources are doing their best and have introduced some initiatives aiming to involve locals in conservation and bring up a sense of stewardship for overall wildlife in general and Markhor in particular.

One such activity was the commencing of trophy hunting of Markhor in Chitral District, and then this activity was replicated to other areas and targeted other species like Himalayan Ibex by the Provincial Wildlife Department of Khyber Pakhtunkhwa.

Although this practice was initiated in 1983, yet the local communities were not directly involved. To engage local communities directly in conservation, two community game reserves were established, Tooshi-Sasha and Gehraite-Golain Markhor Conservancies, where trophy hunting was officially authorized in 1998. This scheme was initiated with sole aim of involving the community in conservation efforts of this iconic species and to instill the sense of stewardship in them to become the custodian of overall wildlife (Ali et al. 2015). It is pertinent to note that revenue generated in lieu of permit fee from the hunters, 80% share is given to the community while 20% revenue goes to government (Wildlife Department Khyber Pakhtunkhwa 2010). The number of hunting permits are issued based on annual population survey of the species. The recent survey indicates that population is on rise and stands close to 2700 individuals. consequently the trophy hunting quota has been increased up to three in the past decade as a consequence of this scheme. The most pleasant and positive outcome of this effort is the change in the perception of local communities about wildlife in general and Markhor in particular as now people deem them their "own precious asset".


© Abdullah Khan

The amount paid to them is deposited in the Village Conservation Committee (VCC) account from where it is spent on the overall development and infrastructure projects, which have brought a very positive change in their life. We quote few instances here that reflect the success of this initiative. In one village of Tooshi-Sasha Conservancy, a community school has been established from the fund of trophy hunting and the teachers are paid from it. Now the children of that village obtain their primary education from the very school, and this has led to enhancement in literacy ratio, especially among females. Similarly, a bridge has been constructed from the said scheme and surprisingly named as Markhor



Map depicting Markhor trophy hunting conservancies in Chitral District, Northern Pakistan

bridge. Besides these described projects, many more are being carried out. In a nutshell, trophy hunting as a conservation tool has proved a success story here in revival of the overall wildlife, as it is evident from an increase in the numbers of markhor each year in census reports and physical sightings from roadside validate this claim. Furthermore, ecologically this economic incentive has not only benefited Markhor but the entire wildlife, including carnivores has been protected as evident from the filming of Himalayan Lynx for the first time from these conservancies.

© Abdullah Khan

References:

Ali, H., M.M. Shafi, H. Khan, M. Shah & M. Khan (2015). Socio-economic benefits of community based trophy hunting programs. *Environmental economics* 6(1): 9-17.

Baig, M.B. & F.S. Al-Subaiee (2009). Biodiversity in Pakistan: key issues. *Biodiversity* 10(4): 20–29.

Khan, H. & S.U. Baig (2020). Biodiversity conservation in the Hindu Kush-Karakoram-Himalayan mountain region of northern Pakistan: Overview of big mammal protection. *Journal of Mountain Science* 17: 1360–1373. https://doi.org/10.1007/s11629-018-5113-0

Michel, S. & T.R. Michel (2015). *Capra falconeri* (errata version published in 2016). *The IUCN Red List of Threatened Species* 2015: e.T3787A97218336. https://dx.doi.org/10.2305/IUCN.UK.20154.RLTS.T3787A82028427.en. Downloaded on 03August 2020.

Wildlife Department Khyber Pakhtunkhwa (2010). Markhor Conservation Plan for Tooshi Shasha Conservancy Reports, pp. 14–45.

Ejaz Rehman[1] & Romaan Hayat Khattak[2]
[1]Snow Leopard Foundation, Islamabad Pakistan
[2]College of Wildlife and Protected Areas, Northeast Forestry University, Harbin 150040, P.R.China
Emails: [1]ejaz@slf.org.pk, [2]romaanktk@gmail.com (corresponding author)

Citation: Rehman, E. & R.H. Khattak (2020). Trophy hunting impacts on Kashmir Markhor and changing the negative perception of local communities about wildlife in Chitral District, Pakistan. Mammal Tales #20, In: *Zoo's Print* 35(10): 12–14.

Locality records of Crab-eating Mongoose from Nepal

Image 1. Dead Crab-eating Mongoose *Herpestes urva* from Barpak, Gorkha (© Shyam Basnet).

On 12 June, 2018, a single Crab-eating Mongoose *Herpestes urva* was found dead due to unknown cause in Dhodeni Village ward number 4, Azirkot Rural Municipality, Gorkha District. Six months later two individuals were photographed by camera traps at two different stations (in Kalimati and Mahadevtaar villages, Bhimsen Thapa Rural Municipality, Gorkha District). The species was camera trapped at an elevation of 607m in close proximity of the settlement around 1km where human intrusions and grazing were excessive. On 21 March 2020, we photographed a single Crab-eating Mongoose from Rupa Lake, Kaski District in marshy agricultural field (Fig.1). The species was recorded at 15.51h with a total of three photographs taken from Coolpix Nikon P1000 camera. It was sighted at an elevation of 590m in the close proximity of <30m water source, ca. 180m from the nearest human settlement. This note presents recent records of Crab-eating Mongoose from Gorkha and Kaski districts, Nepal.

Fry (1925) recorded Crab-eating Mongoose in Gorkha which was also the first record from that district in Nepal. Our record lies 35km north (Azirkot; death record) and 30km east (Bhimsen rural municipality; camera trapped) of previous record from Gorkha (Table 1). As mentioned in Jnawali et al. (2011), Rayamajhi et al. (2019), and Pandeya & Khanal (2019) of the distributional range, we also recorded the species in the tropical region from Gorkha (Sal *Shorea robusta* dominated forest), Kaski

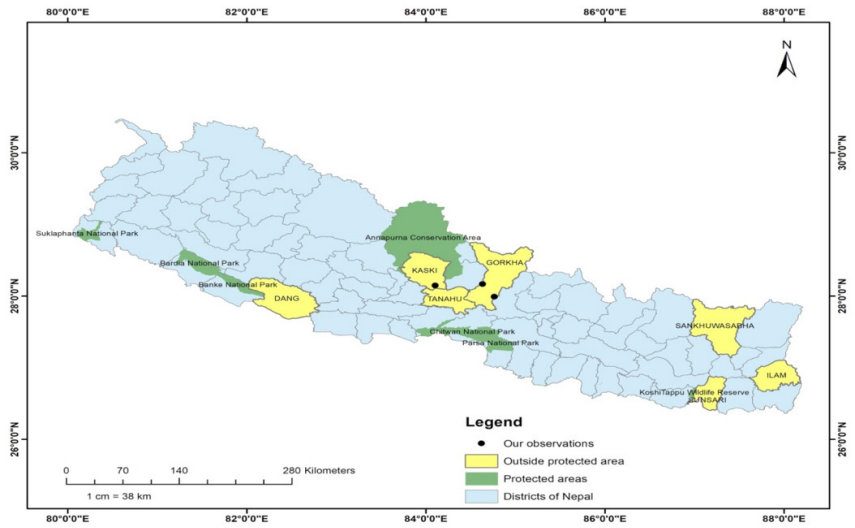


Fig. 1. Distribution of Crab-eating Mongoose in Nepal.

District (Image 1,2). Our recording with <5m distance from the nearest water source, <500m from the nearest human settlement are similar with (Pandeya & Khanal 2019). According to local people, the species is frequently seen in the paddy terraces near the streams during the morning and evening time searching and feeding on the crabs, frogs and small fishes as also described by (Chuang & Lee 1997; Thapa, 2013**)**. Jnawali et al. (2011) suggested wider occurrence of species range in the country. In light of these, our record corroborates the verifiable evidences from Gorkha and Kaski districts of Nepal. Species spatial and temporal distribution information, generated nationally at large scale is deemed necessary for fabrication of conservation management plan. Rigorous camera trapping survey and specific species focused

Image 2. Camera trap photograph of Crab-eating Mongoose from Bhimsen Thapa Rural Municipality, Nepal.

Table 1. Spatial distribution of Crab-eating Mongoose in Nepal.

	Location	GPS coordinates	Elevation	Habitat	Citation	Remarks
1	Shuklaphanta National Park	-	-	-	Poudyal et al. 2019	Camera trapping record
2	Bardiya National Park	-	-	-	BaNP/NTNC-BCP 2019.	Camera trapping record
3	Chitwan National Park	-	-	Sub-tropical Deciduous, evergreen sal forest	Rayamajhi et al. 2019	Camera trapping record
4	Annapurna Conservation Area	-	-	-	Suwal & Verheugt 1995; Majupuria & Kumar (Majupuria) 2006; Jnawali et al. 2011	Unverifiable record
5	Koshi Tappu Wildlife Reserve	-	-	-	Jnawali et al. 2011	Unverifiable record
6	Illam (Mai Pokhari) District	-	-	-	Jnawali et al. 2011	Unverifiable record
7	Dharan forest, Dharan and Sunsari District	-	-	-	Baral in litt. 2013	Unverifiable record
8	Sankhusawaha District	(27.27611 N & 87.3588 E), (27.2747 N, 87.3583 E) & (27.2752 N, 87.3566 E)	1201m, 1264m &1198m	Paddy field and wetland (sim in Nepali)	Thapa 2013	Photographic evidence
9	Parsa National Park	(27.3775 N, 84.80583 E)	330m	*Imperata cylindrica* grassland with sal dominated forest	Sharma & Lamichhane 2017	Camera trapping record
10	Banke National Park	-	-	-	BaNP/NTNC-BCP 2019.	Camera trapping record
11	Tinjure Milke Jaljale complex	-	-	-	Rai et al. 2018	Camera trapping record
12	Tanahun District	28.05611 N & 84.42055 S	571m	-	Tashi R. Ghale photograph	Photographic evidence
13	Gorkha District	27.98947 N & 84.76437 S	607m	Marshy agricultural land, stream bank with sal dominated forest	Present study	Photographic evidence
14	Dang District	28.00596 N & 82.53140 E	703m	Deciduous sal forest at the foothill of Chure region	Pandeya & Khanal 2019	Photographic evidence
15	Kaski District	28.14472 N & 84.10277	590m	Marshy agricultural land	Present study	Photographic evidence

Image 3. Crab-eating Mongoose in marshy agricultural landscape from Rupa Lake, Kaski District (© Milan Baral).

direct and indirect survey should be done outside the protected areas system to exaggerate the concrete data on the ecology and threats being faced.

References

BaNP/NTNC-BCP (2019). Mammals of Banke National Park and Buffer Zone. Banke National Park and National Trust for Nature Conservation, Bardia Conservation Program.

BaNP/NTNC-BCP (2019). Mammals of Bardia National Park and Buffer Zone. Bardia National Park and National Trust for Nature Conservation, Bardia Conservation Program,

Choudhury, A., R. Timmins, W. Chutipong, J.W. Duckworth, D. Mudappa & D.H.A. Willcox (2015). *Herpestes urva* (errata version published in 2016). The IUCN Red List of Threatened Species 2015:e. T41618A86159618. Downloaded on 05 January 2019. https://doi.org/10.2305/IUCN.UK.2015-4.RLTS.T41618A45208308.en.

Fry, T.B. (1925). Bombay Natural History Society's mammal survey of India, Burmah and Ceylon. Report No. 37a: Nepal. *Journal of the Bombay Natural History* Society 30: 525–530.

Jnawali, S.R., H.S. Baral, S. Lee, K.P. Acharya, G.P. Upadhyay, M. Pandey, R. Shrestha, D. Joshi, B.R. Laminchhane, J. Griffiths, A.P. Khatiwada, N. Subedi & R. Amin (compilers) (2011). The status of Nepal mammals: the national Red List series. Department of National Parks and Wildlife Conservation, Kathmandu, Nepal.

Majupuria, T.C. & R. Kumar (Majupuria) (2006). Wildlife and protected areas of Nepal [resources and management]. S. Devi, Sharanpur, India.

Pandeya, P. & C. Khanal (2019). First record of Crab-eating Mongoose in Dang District, western Nepal. *The Himalayan Naturalist* 2(1): 46–47.

Poudyal, L., B. Lamichhane, U. Paudel, S. Niraula, A. Prasai, S. Malla, N. Subedi, K. Thapa & B. Dahal (2019). Mammals of Shuklaphanta: an account from camera trap survey. Shuklaphanta National Park Office, Kanchanpur, Nepal. Friends of Nature (FON), Kathmandu, Nepal, 20pp.

Raj, J., K. Yadav, Y. Ghimirey, S. GC, R. Acharya, K. Thapa, L.P. Poudyal & N. Singh (2018). Small Carnivores in Tinjure-Milke-Jaljale, eastern Nepal. Friends of Nature, Nepal and Rufford Small Grants, UK.

Rayamajhi, T., S. Lamichhane, A. Gurung, P. Regmi, C. Pokheral & B. Lamichhane (2019). First camera trap documentation of the Crab-eating Mongoose *Herpestes urva* (Hodgson, 1836) (Carnivora: Feliformia: Herpestidae) in Barandabhar Corridor Forest in Chitwan, Nepal. *Journal of Threatened Taxa* 11(8): 14051-14055. https://doi.org/10.11609/jott.4567.11.8.14051-14055.

Sharma, B. & B.R. Lamichhane (2017). Record of Crab-eating Mongoose *Herpestes urva* from Parsa Wildlife Reserve, central Nepal. Small Carnivore Conservation 55: 97–103.

Suwal, R. & W.J.M. Verheugt (1995). Enumeration of mammals of Nepal. Department of National Parks and Wildlife Conservation (Biodiversity Profiles Project Publication 6), Ministry of Forest and Soil Conservation, Kathmandu, Nepal.

Thapa, S. (2013). Observations of Crab-eating Mongoose *Herpestes urva* in eastern Nepal. Small Carnivore Conservation 49: 31–33.

Acknowledgements: We are grateful to: the Department of Forest and Soil Conservation and District Forest Office Gorkha for allowing us to conduct the research; the Small Mammals Conservation and Research Foundation for funding support on the topic "Ethno Otter survey in Budhigandaki region, Nepal" during which this camera trapping record was made; Sanjan Thapa, and other reviewers for reviewing the manuscript; citizen scientist Tashi R. Ghale for providing the details of the recording from the Tanahun; Dr. Baburam Lamichhane, Yadav Ghimirey for help in identification of the species; Jyoti Bhandari, Assistant Professor, Institute of Forestry Pokhara campus, Nepal; Bidhya Sharma for providing useful suggestions and comments; and Mr. Shyam Basnet for his guidance and motivation in the field.

Bhuwan Singh Bist[1], Aarati Basnet[2], Prashant Ghimire[3], Milan Baral[4], Anisha Neupane[5] & Chiranjibi Prasad Pokheral[6]

[1] The School of Forestry and Natural Resource Management, IOF, Kritipur, Nepal.
[2,4&5] Institute of Forestry, Pokhara Campus, Nepal.
[3] Faculty of Science, Health and Technology, Nepal Open University, Lalitpur, Nepal.
[6] National Trust for Nature Conservation (NTNC), Khumaltar, Kathmandu, Nepal.
Email: [1]bhuwanbistaiof@gmail.com (corresponding author)

Citation: Bist, B.S., A. Basnet, P. Ghimire, M. Baral, A. Neupane & C.P. Pokheral (2020). Locality records of Crab-eating Mongoose from Nepal. Mammal Tales #21, In: *Zoo's Print* 35(10): 15–18.

Occurrence of Indian Fox in Tiruvannamalai, Tamil Nadu

Indian Fox *Vulpes bengalensis* in Adiannamalai Lake, Tiruvannamalai, Tamil Nadu: A—Female Indian Fox | B—Indian Fox pups (© R. Sivakumar).

The Indian Fox *Vulpes bengalensis* (Shaw, 1800) is endemic to the Indian subcontinent. It ranges from the foothills of the Himalaya in Nepal to the southern tip of the Indian peninsula. In southern India, only few studies were done on this species in Karnataka and Andhra Pradesh (Manakadan & Rahmani 2002; Home 2005; Vanak 2005; Bhaskaran 2006; Kumara & Singh 2012).

In Tamil Nadu there are only a few distribution records available in Nanguneri (Kanniyakumari District) and Vazhapadi (Salem District) (Johnsingh 1978; Gompper & Vanak 2006; Vijayakumar 2020). Here, we report the Indian Fox from Tiruvannamalai, Tamil Nadu.

During our bird watching trips during 2018–2019, we had seen seven Individuals of Indian Fox in Tiruvannamalai and surrounding locations (Table 1). In Adiannamalai lake and surroundings, we had seen one adult female Indian fox with two pups and photographed. All the sighting locations are close to human habitation except, Kannamadai Reserve Forest, which is scrub jungle with grassland patches.

Indian Fox *Vulpes bengalensis* (Shaw, 1800) is classified as Least Concern as per IUCN Red List (Jhala 2016). We saw threats like hunting activities by *Narikuravas* and building constructions are going on Kannathampoondi and other locations are very close to highways. Teaching local peoples and forest officials to conserve the species through awareness programmes.

Table 1. Locations of Indian Fox Vulpes bengalensis in Tiruvannamalai, Tamil Nadu.

Place	GPS location	No. of individuals	Date	Time	Habitat type
Adiannamalai Lake	12.253300 79.020067	3	30.iv.2018	1817	Dry grassland with rocky patches
Kannakurikkai	12.262383 78.967383	2	12.v.2018	0658	Dry grassland with rocky patches
Kannathampoondi	12.204283 79.028033	1	18.viii.2019	1822	Dry grassland with rocky patches
Kannamadai	12.152767 79.083467	1	13.ix.2019	0630	Reserve Forest (scrub jungle)

Location of Indian Fox *Vulpes bengalensis* in Tiruvannamalai,Tamil Nadu (map prepared using Google Earth).

References

Bhaskaran, A. (2006). Modelling Habitat Selection of the Indian Fox (*Vulpes bengalensis*) in and around the Great Bustard Wildlife Sanctuary, Nannaj, Maharashtra. M.S. Thesis, The Manipal Academy of Higher Education (Deemed University), Karnataka, India.

Gompper, M.E. & A.T. Vanak (2006). *Vulpes bengalensis*. *Mammalian Species*, 2006(795): 1–5. https://doi.org/10.1644/795.1

Home, C. (2005). Resource Utilization by the Indian Fox *Vulpes bengalensis* in Kutch, Gujarat. M.S. Thesis. Saurashtra University, Rajkot, India.

Jhala, Y. (2016). *Vulpes bengalensis*. The IUCN Red List of Threatened Species 2016: e.T23049A81069636. https://doi.org/10.2305/IUCN.UK.2016-1.RLTS.T23049A81069636.en. Downloaded on 14 September 2020.

Johnsingh, A.J.T. (1978). Some aspects of the ecology and behaviour of the Indian fox *Vulpes bengalensis* Shaw. *Journal of the Bombay Natural History Society* 75: 397–405.

Kumara, H.N. & M. Singh (2012). Distribution, den characteristics and diet of the Indian Fox *Vulpes bengalensis* (Mammalia: Canidae) in Karnataka, India: preliminary observations. *Journal of Threatened Taxa* 4(14): 3349–3354. https://doi.org/10.11609/JoTT.o3046.3349-54

Manakadan, R. & A.R. Rahmani (2002). Population and ecology of the Indian fox *Vulpes bengalensis* at Rollapadu wildlife sanctuary, Andhra Pradesh, India. *Journal of the Bombay Natural History Society* 97: 3–14.

Vanak, A.T. (2005). Distribution and status survey of the Indian Fox (*Vulpes bengalensis*) in southern India. *Canid News* 8(1): 1–5.

Vijayakumar, V. (2020). Pongal spells peril for Salem's foxes. *The Hindu*,12 January 2020; https://www.thehindu.com/news/national/tamil-nadu/pongal-spells-peril-for-salems-foxes/article30552014.ece. Accesed on 14 September 2020.

Acknowledgements: We thank to Department of Zoology and Wildlife Biology, A.V.C College (Autonomous), Mannampandal, Mayiladuthurai for support this survey and additionally we thank to Mr. Arun and Dr. Brawin Kumar for their help during the field survey. We are thankful to Idea Wild for the equipment support.

A. Kalaimani[1] & R. Sivakumar[2]

[1] Department of Zoology and Wildlife Biology, A.V.C College (Autonomous), Mayiladuthurai, Nagapattinam, Tamil Nadu 609305, India .

[2] The Forest Way, Arunagiri Childrens Park, Tiruvannamalai, Tamil Nadu 606603, India.

Emails: [1]manikalai16@yahoo.com (corresponding author), [2]kumarart8@gmail.com

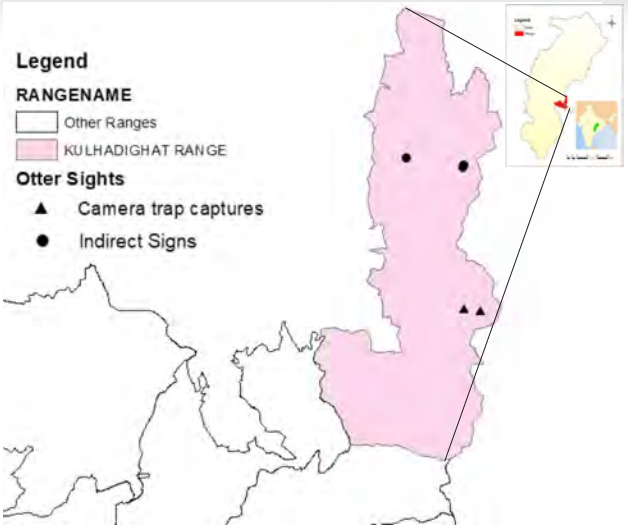
Citation: Kalaimani, A. & R. Sivakumar (2020). Occurrence of Indian Fox in Tiruvannamalai, Tamil Nadu. Mammal Tales #22, In: *Zoo's Print* 35(10): 19–20.

First photographic evidence of Asian Small-clawed Otter from Udanti Sitanadi Tiger Reserve

Photo captures of Asian Small-clawed Otter.

Otters belong to the mammalian order Carnivora and family Mustelidae. There are 13 species of otters distributed worldwide (Corbet & Hill 1980) and in India there are only three species of otter: Eurasian Otter *Lutra lutra* (Linnaeus, 1758), Smooth-coated Otter *Lutrogale perspicillata* (I. Geoffroy Saint-Hilaire, 1826), and Asian Small-clawed Otter *Aonyx cinereus* (Illiger, 1815) (Menon 2014). But none of them have been ever reported from Chhattisgarh. Asian Small-clawed Otter is the smallest of the three species and is till date known from northern, southern, and eastern most parts of India (Hussain et al. 2011) and recently reported from Karlapat Wildlife Sanctuary and Kotagarh Wildlife Sanctuary, Odisha (Mohapatra et al. 2014), which are near to the study area. This species inhabits perennial hilly streams of the riparian systems with big boulders and with or without a wide river bank (Mohapatra et al. 2014). Asian or Oriental Small-clawed Otter is classified as Vulnerable as per IUCN Red List, protected under Schedule I of Wildlife (Protection) Act, 1972, and in Appendix I of Convention on International Trade in Endangered Species (CITES). Being an apex predator, otters play an important role in maintaining nutrition cycle between aquatic and terrestrial eco systems (Ben-David et al. 1998).

Chhattisgarh was carved out of Madhya Pradesh in 2000 and is a tribal-dominated land with wild-spaces shared among both humans and wildlife. Increasing human



Otter sightings in Udanti Sitanadi Tiger Reserve during study.

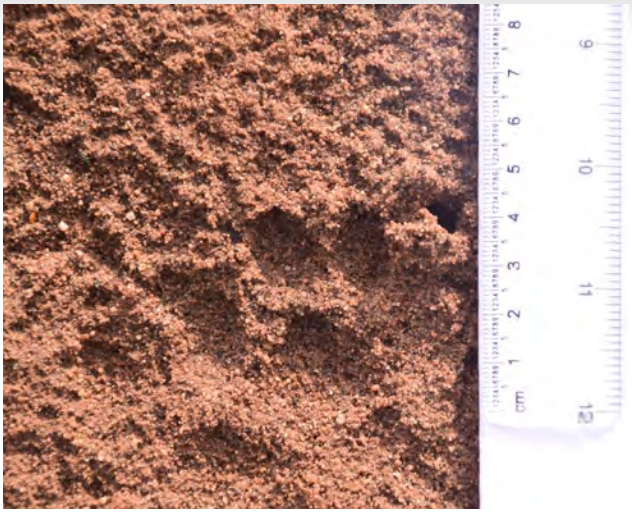
population, degradation of forest land, forest fires, and hunting activities spared a narrow domain for the wildlife to live and thrive. Due to political unrest, the rich biodiversity was highly unexplored for many years. Multiple species are losing their existence or may also go locally extinct and unnoticed.

Udanti Sitanadi Tiger Reserve (USTR) was commissioned in 2009 (Gazette notification No. F8-43/2007/10-2, 20 February 2009) while including Sitanadi Sanctuary (Gazette notification No./5093-3725/X/2/74, 1 November 1974) and Udanti Sanctuary (Gazette notification No./15/4/83/10/2, 9 March 1984) as critical core areas, along with Kulhadighat range, Indagaon range and Tourenga range as buffer zone. It is situated between 20.526 to 19.935 latitude and 81.798 to 82.438 longitude. Kulhadighat range is the only plateau region of the tiger reserve that ranges from 540 to 890 m. It has mixed forests, while the plains bear predominant sal forest patches and sparse bamboo plots. The water sources in the region are perennial with less biotic pressure.

Camera trapping was conducted in the Udanti Sitanadi Tiger Reserve during All India Tiger Estimation in 2018 and camera traps were deployed across the tiger reserve. We already had anecdotal records of otter presence in the area. During camera trapping session while camera traps deployed for tigers, co-predators and their prey base, some of the camera traps were deployed in the sites used by otters. The camera traps were deployed in the field for the duration of 30 days and, got six different photographic evidence of Asian Smal-clawed Otter in two different camera trap units separated by 1,000m from each other. Cuddeback professional series camera traps were used and deployed for camera trapping.

To record observations related to sighting locations, we used Garmin etrex 10 model and QGIS 2.18.26 for the preparation of maps. Another set of evidences were collected 10km away region where holts, spraints, and tracks were identified across 1-km stretch of shallow river. While interviewing the locals, it was found that the

Photo capture from another location of Asian Small-clawed Otter.



Asian Small-clawed Otter tracks measured with the help of scale.

creature called by local vernacular name "Pânisuna", is wide spread across rivers and streams across the Kulhadighat range. As per the locals, pretty often they found their fish-nets being torn by the otters. In other areas of the Kulhadighat range, with the help of locals, nesting sight of these otters were identified from spraints with lots of crab waste that justified it to be Asian Small-clawed Otter (Sivasothi 1994). Based on sign survey, camera traps were deployed and successful photographic captures were recorded. Species confirmation was done with the help of available standard literature of Prater (1971) and Menon (2014).

As per the discussions with local forest villagers and tribal communities, identifying signs on trails across river streams from Kukrar beat and a total of six photo captures from Dadaipani beat of Kulhadighat range of USTR during camera trapping session suggests its distribution across the Kulhadighat range of the tiger reserve (Table 1). This is perhaps the first report of the distribution of otter in Chhattisgarh.

From Odisha, the species was identified and reported from Mahanadi River basin (Mohapatra et al. 2014), and again Mahanadi River basin of Chhattisgarh region where the evidence of the species is being reported. This supports the fact that Asian Small-clawed Otter may be widely distributed across Mahanadi basin and needs to be further assessed. The scat samples observed during trails contained 80% to 90% undigested exoskeleton crab-waste and the length of its claw marks measured to be 43mm.

USTR is an important part of a tiger conservation landscape and it provides valuable corridor connectivity between Barnawapara Wildlife Sanctuary, Chhattisgarh in the north-east, Sunabeda Wildlife Sanctuary, Odisha in the east, and to Indravati Tiger Reserve, Chhattisgarh in the south. Fortunately, a small number of new species have even reported earlier from the USTR, Indian Mouse Deer (Basak et al. 2017) and Rusty-spotted Cat (Basak et al. 2018). Now the first photographic evidence

Spraints found across river trails in the area of otters.

of Asian Small-clawed Otter signifies its prime importance and raises need of conservation efforts for the small mammalian fauna along with conservation of charismatic tiger, co-predators, and their prey species. Discovering new distributions across the landscape helps in strengthening the scientific understanding of the species and its habitat. This article shall also help other workers and policy maker in undertaking comprehensive steps for long term in situ conservation of this species in Chhattisgarh. This opens a broad dimension in studying the ecology and status of Asian Small-clawed Otter in this pristine landscape central India.

Of the total 1,842km^2 of the tiger reserve, the population of Asian Small-clawed Otter was confined to only Kulhadighat range. As discussed with the forest villagers there are no direct threats from the locals to these animals, but fragmentation of habitat and deforestation are some of the issues that may deteriorate their present population. Many times while locals lay fish-nets across

Habitat preferred by Asian Small-clawed Otter in Udanti Sitanadi Tiger Reserve, Gariyaband.

Table 1. Description of direct and indirect signs of Asian Small-clawed Otter found from study area.

Location	Coordinates	Habitat descriptions	Remarks
Dadaipani beat, Kulhadighat range	20.291 N 82.407 E	Stream having depth 1-1.5 m with sandy substrate and medium to small rock boulders.	Photo capture through camera traps and tracks.
Dadaipani beat, Kulhadighat range	20.289 N 82.421 E	Same as Above.	Photo capture through camera traps.
Kukrar beat, Kulhadighat range	20.402 N 82.406 E	Stream having depth above 2 m with large to medium rock boulders and sandy substrate.	Tracks recorded.
Kukrar beat, Kulhadighat range	20.402 N 82.406 E	Same As Above.	Tracks and old spraints recorded.
Kukrar beat, Kulhadighat range	20.404 N 82.407 E	Same As Above.	Here holts were identified where scores of tracks and spraints were recorded across 100 m stretch over bank of river.
Ondh beat, Kulhadighat range	20.410 N 82.359 E	Stream with rock boulders and sandy substrate.	Tracks.

river streams, these otters use to bite and tear their nets. But it was clear that in response, no retaliation was raised by the locals. Similarly, the same site was being used by locals as well as these otters. During summers, the forest fires are another important matter of concern for the otters as well as their habitat. Further studies are solicited on complete status, distribution and threat assessments of this species in the Tiger Reserve and as well as in the state. Conservation of Asian Small-clawed Otter in such a challenging landscape needs skillful and arduous scientific studies along with conservation actions and awareness.

References

Basak, K., M. Ahmed, M. Suraj, C. Sinha, B.V. Reddy, O.P. Yadav & K. Mondal (2017). Confirming presence of Indian mouse deer from Chhattisgarh, Central India with photographic evidence after 112 years. *International Journal of Fauna and Biological Sciences*, 4(4): 192-195. https://www.researchgate.net/publication/319236757_Confirming_presence_of_Indian_mouse_deer_from_Chhattisgarh_Central_India_with_photographic_evidence_after_112_years

Basak, K., M. Ahmed, M. Suraj, C. Sinha, B.V. Reddy, O.P. Yadav & K. Mondal (2018). First picture and temporal activity of Rusty-spotted Cat from Chhattisgarh, Central India. *CATnews,* 67: 27-29. http://www.catsg.org/catnews/index.php?id=705

Ben-David, M., R.T. Bowyer, L.K. Duffy, D.D. Roby & D.M. Schell (1998). Social behavior and ecosystem processes: river otter latrines and nutrient dynamics of terrestrial vegetation. *Ecology,* 79: 2567-2571.

Corbet, G.B. & J.E. Hill J.E. (1980). *A world list of mammalian species*. British Museum and Cornell University Press.

Gyeltshen, J. & C. Dorji (2015). Sighting of Asian Small-clawed Otter: A new small mammal record from Thrumshingla National Park; *Small Mammal Mail* - Bi-Annual Newsletter of CCINSA & RISCINSA 7(1): 20-22.

Hon, N., N. Phearoom, K. Vengsong & C. Vichet (2010). Food And Habitat Of Asian Small-clawed Otters In Northeastern Cambodia: IUCN/SCC Otter Specialist Group Bulletin, 27(1): 12-23· https://www.researchgate.net/publication/42107557_Food_And_Habitat_Of_Asian_Small-Clawed_Otters_In_Northeastern_Cambodia

Hussain, S.A., S.K. Gupta, P.K. Silva d (2011). Biology and Ecology of Asian Small-clawed Otter *Aonyx cinereus* (Illiger, 1815): A review; IUCN Otter Spec. *Group Bull*. 28(2): 63-74.

Mohapatra, P.P., H.S. Patel & S.A. Hussain (2014). Occurrence of Asian Small-clawed Otter *Aonyx cinereus* (Illiger, 1815) in Eastern Indian. *Current Science*, 107(3): 367. https://www.researchgate.net/publication/263366590

Prakash, N., D. Mudappa, T.R.S. Raman & A. Kumar (2012). Conservation of the Asian Small-Clawed Otter (*Aonyx Cinereus*) in Human-Modified Landscapes, Western Ghats, India. *Tropical Conservation Science*, 5(1): 67-78. https://www.researchgate.net/publication/258699777

Sivasothi, N. (1994). A review of otters in Malaysia and Singapore. *Hydrobiologia* 285: 151-170. https://www.researchgate.net/publication/226229323

Acknowledgements: We thank Mr. O.P. Yadav (then field director, USTR) and Mr. B.V. Reddy (then deputy director, USTR) for their support and guidance; Mr. K.K. Bisen (IFS) and Mr. Vishnuraj Nair (deputy director, USTR) for allowing us to continue the project under their guidance; Mr. Krishnendu Basak, WTI for his able guidance and comments on the manuscript. It may not be possible to collect the data from such tough terrain without the team including Nitesh Kumar Sahu, Om Prakash, Ajaz Ahmed, Nitesh Dewangan, from Nova Nature Welfare Society; we extend our sincere thanks for their efforts. We are grateful to the people from forest villages who assisted us with their immense knowledge of forests and wildlife.

M. Suraj[1], Moiz Ahmed[2] & Faiz Bux[3]
[1&2] Nova Nature Welfare Society, 36/337, Behind Chhoti Masjid, Byron Bazar, Raipur Chhattisgarh 492001, India.
[3] Department of Botany, Government D.B.G.P.G. College, Raipur, Chhattisgarh 492001, India.
Email: [1]mat.suraj@gmail.com (corresponding author), [2]moizsavetiger@gmail.com, [3]faizbux@gmail.com

Citation: Suraj, M., M. Ahmed & F. Bux (2020). First photographic evidence of Asian Small-clawed Otter from Udanti Sitanadi Tiger Reserve. Mammal Tales #23, In: *Zoo's Print* 35(10): 21–25.

ISSN 2230-7052
#189
21 October 2020
BUGS R ALL
Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

Odonates of Irinjalakuda ponds of central Kerala, India

One of the ponds sampled. Debris from the waste dumped can be seen floating (© Amitha Wilson).

Dragonflies and damselflies (Odonata) are good indicators of the freshwater ecosystem health because of their amphibious life history, relatively short generation time, high trophic position, and diversity (Corbet 1993). Ponds are home to a diverse community of specialized plants and animals and are hence of great conservation concern. Through land-use changes, ponds have been disappearing rapidly and the remaining ponds are often threatened by contamination and eutrophication, with negative consequences for pond-dependent taxa like Odonata (Janssen et al. 2018). Irinjalakuda is a municipal town in Thrissur District, Kerala, India. Irinjalakuda has a number of public and private ponds like most parts of the state. Twenty man-made ponds with public access were selected randomly in and around Irinjalakuda for sampling odonates (Figure 1 & Table 1).

The fieldwork was done in the post-monsoon season (November 2019–February 2020). Each pond was visited between 09 AM and 11 AM in sunny weather. The observers walked along the banks of each pond at constant pace for 30 minutes and recorded the species and the number of individuals seen. All individual odonates observed

ISSN 2230-7052
#189
21 October 2020
BUGS R ALL
Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

Table 1. GPS locations and odonate diversity of the ponds sampled.

Pond no.	Name of the pond	GPS location (Lat.–Long.)	Species richness	Shannon index (H)
1	Near Christ College basketball court	10.358870–76.214837	12	1.76
2	Kuttamkulam	10.346703–76.203406	11	2.19
3	Thamarakulam	10.346484–76.199814	6	1.67
4	Mannathikulam	10.350657–76.200152	4	0.7
5	Njourikulam	10.348087–76.213416	14	2.53
6	Oomenkulam	10.345397–76.19944	5	1.17
7	Brahmakulam	10.33725–76.190875	12	2.45
8	Thekkekulam	10.345381–76.200298	6	1.47
9	Kesavankulangara temple pond	10.357995–76.219401	10	2.27
10	Parakulam	10.357479–76.186495	6	1.74
11	Thrithanni ambalakulam	10.358049–76.190074	12	2.39
12	Padmanabhaswami kshethrakulam	10.360912–76.183011	11	2.25
13	Pond 13	10.347648–76.182623	11	2.39
14	Pond 14	10.363761–76.194351	14	1.97
15	Kizhuthani ambalakulam	10.366118–76.188235	17	2.32
16	Manthripulam kulam	10.344961–76.231876	8	1.87
17	Pond near Avittathur road	10.340845–76.238879	9	1.92
18	Thommana irrigation pond	10.331622–76.263026	9	2.11
19	Thazhekkad Sivashekthra kulam	10.334641–76.271885	6	1.73
20	Karakulam	10.324312–76.282514	11	2.16

were photographed using a Nikon Coolpix P-900 digital camera. Damselflies, especially *Pseudagrion* species which are difficult to identify were caught using a sweep net, detailed photographs taken, and released. Species were identified referring to field guides (Subramanian 2009; Kiran & Raju 2013) and taxonomic monographs (Fraser 1933, 1934, 1936). The odonate species were categorized into five relative frequency classes, based on the number of ponds in which they occurred. The categories include very common (80%–100%), common (60%–80%), occasional (40%–60%), rare (20%–40%), and very rare (<20%). Area and perimeter of the ponds were estimated using QGIS 3.12. Vegetation along the fringes of the pond (Vf), vegetation in the water body (Vw) and algal cover (Va) were recorded for each pond based on a visual scoring from 0

ISSN 2230-7052
#189
21 October 2020
BUGS R ALL
Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

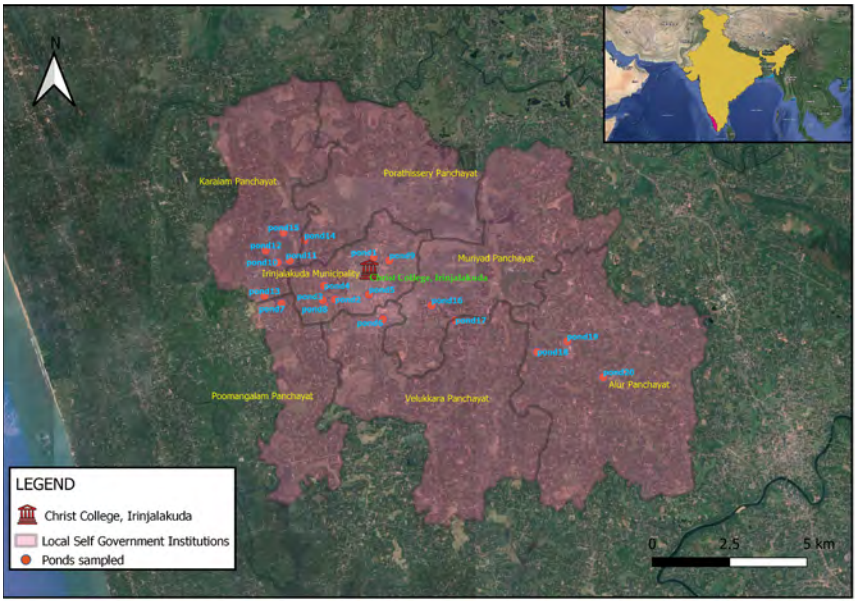


Figure 1. Locations of the ponds sampled in Irinjalakuda.

to 10, 0 indicating no cover and 10 meaning 100% cover. Eight water quality parameters of the pond waters were estimated by standard methods – alkalinity, conductivity, total dissolved solids (TDS), dissolved oxygen (DO), biochemical oxygen demand (BOD), acidity, temperature, and pH (Greenberg et al. 1992). Shannon index (H) calculated for each pond was tested for correlation with the 13 habitat parameters measured.

Thirty species from five families of the order Odonata were recorded in the study, of which 19 were dragonflies (suborder Anisoptera) and 11 were damselflies (suborder Zygoptera) (Table 2). This forms 17.75% of the total odonate species recorded from the state of Kerala till date (Society for Odonate Studies 2020). Of these, three species belonged to the Very Common (VC) relative frequency class, one species to Common (C), six species to Occasional (O), eight species to Rare (R), and 12 species to Very Rare (VR). All damselfly species were either Very Rare (VR) or Rare (R). Scarcity of shade in the sampled ponds and the limited dispersal ability of damselflies were probably responsible for their low abundance. The most common species was

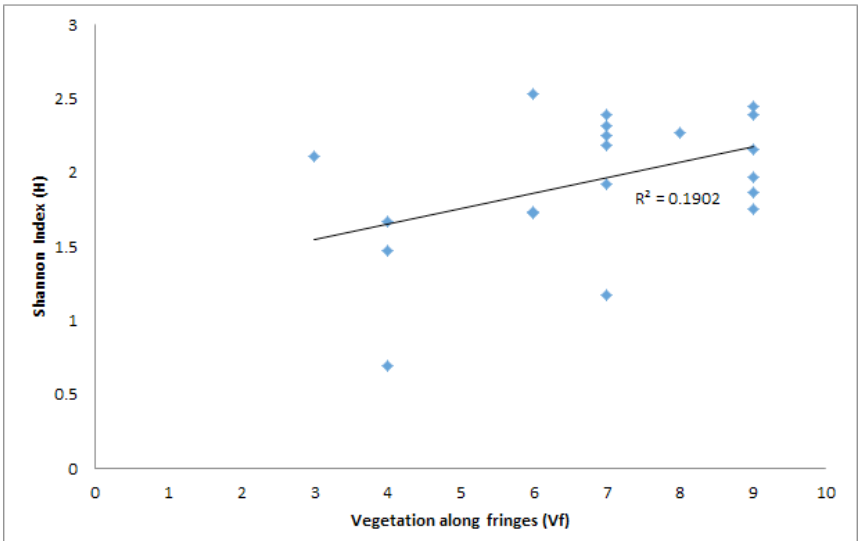


Figure 2. Scatterplot of the score for vegetation along the fringes and Shannon Index (H) of the ponds.

ISSN 2230-7052
#189
21 October 2020
Bugs R All
Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

Table 2. Odonate species recorded in the study with their relative frequencies of occurrence. Relative frequency classes: VC- Very Common, C- Common, O- Occasional, R- Rare, VR- Very rare.

	Name of species	Common name	Relative frequency
	Class: Insecta **Order: Odonata** **Suborder: Anisoptera**		
	Family: Macromiidae		
1	*Epophthalmia vittata*	Common Torrent Hawk	R
	Family: Gomphidae		
2	*Ictinogomphus rapax*	Common Clubtail	O
	Family: Libellulidae		
3	*Acisoma panorpoides*	Trumpet Tail	O
4	*Aethriamanta brevipennis*	Scarlet Marsh Hawk	R
5	*Brachydiplax chalybea*	Rufous-backed Marsh Hawk	O
6	*Brachythemis contaminata*	Ditch Jewel	VC
7	*Bradinopyga geminata*	Granite Ghost	VR
8	*Crocothemis servilia*	Ruddy Marsh Skimmer	O
9	*Diplacodes trivialis*	Ground Skimmer	R
10	*Hydrobasileus croceus*	Amber-winged Marsh Glider	R
11	*Neurothemis tullia*	Pied Paddy Skimmer	O
12	*Orthetrum chrysis*	Brown-backed Red Marsh Hawk	VR
13	*Orthetrum sabina*	Green Marsh Hawk	VC
14	*Pantala flavescens*	Wandering Glider	C
15	*Rhodothemis rufa*	Rufous Marsh Glider	O
16	*Rhyothemis variegata*	Common Picturewing	VC
17	*Tramea limbata*	Black Marsh Totter	VR
18	*Trithemis pallidinervis*	Long-legged Marsh Glider	VR
19	*Urothemis signata*	Greater Crimson Glider	R
	Suborder: Zygoptera		
	Family: Coenagrionidae		
20	*Agriocnemis keralensis*	Kerala Dartlet	VR
21	*Agriocnemis pygmaea*	Pygmy Dartlet	R
22	*Ceriagrion coromandelianum*	Coromandel Marsh Dart	VR
23	*Ceriagrion cerinorubellum*	Orange-tailed Marsh Dart	R
24	*Ischnura rubilio*	Western Golden Dartlet	VR
25	*Ischnura senegalensis*	Senegal Golden Dartlet	VR
26	*Paracercion calamorum*	Dusky Lilly-squatter	VR
27	*Pseudagrion australasiae*	Look-alike Sprite	VR
28	*Pseudagrion malabaricum*	Malabar Sprite	VR
29	*Pseudagrion microcephalum*	Blue Grass Dart	R
	Family: Platycnemididae		
30	*Copera marginipes*	Yellow Bush Dart	VR

ISSN 2230-7052
#189
21 October 2020
BUGS R ALL
Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

Odonata species recorded from the ponds in Irinjalakuda (© Vivek Chandran A).

Acisoma panorpoides

Aethriamanta brevipennis

Agriocnemis keralensis

Agriocnemis pygmaea

Brachydiplax chalybea

Brachythemis contaminata

Bradinopyga geminata

Ceriagrion cerinorubellum

Ceriagrion coromandelianum

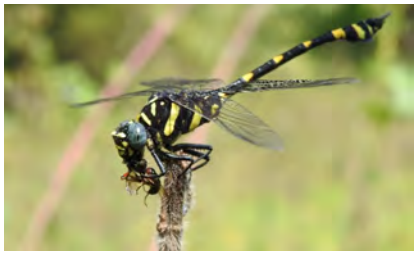
Copera marginipes

Crocothemis servilia

Diplacodes trivialis

Epophthalmia vittata

Hydrobasileus croceus



Ictinogompus rapax

ISSN 2230-7052
#189
21 October 2020
Bugs R All
Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

Ischnura rubilio

Ischnura senegalensis

Neurothemis tullia

Orthetrum chrysis

Orthetrum sabina

Pantala flavescens

Paracercion calamorum

Pseudagrion australasiae

Pseudagrion malabaricum

Pseudagrion microcephalum

Rhodothemis rufa

Rhyothemis variegata

Tramea limbata

Trithemis pallidinervis

Urothemis signata

ISSN 2230-7052
#189
21 October 2020
Bugs R All
Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

Table 3. Habitat parameters ranked according to their influence on odonate diversity.

Habitat parameter	Pearson correlation coefficient (r)	Coefficient of determination (r^2)
Vegetation along fringes (Vf)	+ 0.43611925	0.1902
Dissolved Oxygen (DO)	+ 0.316227766	0.1
Biochemical Oxygen Demand (BOD)	+ 0.273313007	0.0747
Vegetation in water body (Vw)	+ 0.265518361	0.0705
Temperature	+ 0.16583124	0.0275
Perimeter of the pond	+ 0.122065556	0.0149
Area of the pond	+ 0.116619038	0.0136
Alkalinity	- 0.414125585	0.1715
Conductivity	- 0.409878031	0.168
Total Dissolved Solids (TDS)	- 0.390256326	0.1523
Acidity	- 0.184119526	0.0339
Vegetation- algal cover (Va)	- 0.059160798	0.0035
pH	- 0.007745967	0.00006

Brachythemis contaminata, recorded from 19 of the 20 ponds sampled. It is a species of polluted waters (Subramanian 2005) and hence its abundance points to the poor water quality of the ponds studied. Dumping of waste was seen in all the ponds sampled (Image 1). This could be the reason behind the low DO (4.72 ± 3.82, n=20) and high BOD (2.03 ± 2.83, n=20) values obtained for the water collected from many of the ponds. The study recorded *Agriocnemis keralensis*, a species endemic to the Western Ghats (Subramanian 2009) from two of the ponds sampled. Of the 13 habitat parameters studied, none had a strong correlation with odonate diversity. However, vegetation along the fringes (Vf) of the ponds had a moderate positive relation (r = +0.43) (Figure 2), and alkalinity and conductivity of the pond water had moderate negative relations (r = -0.41 and r = -0.40 respectively) with odonate diversity (Table 3). Vegetation along the pond fringes usually include grasses, herbs, shrubs and rarely trees which the odonates use for foraging, resting and thermoregulation. Only adult odonates were sampled in this study. It has been shown that urban water sources with poor water quality act as 'ecological traps' for odonates where they may deposit their eggs which never produce adults (Villalobos-Jiménez 2016). Hence, future studies should take into account the presence of larvae and exuviae.

Conclusion

There has been an increased tendency among the local self-governments in Kerala to 'clean' the man-made ponds and revive

ISSN 2230-7052
#189
21 October 2020
Bugs R All
Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

their water storage role as there is scarcity of potable water during the summer months in many parts of the state. Although such revival of ponds can stop dumping of waste and increase the water quality, it often involves removal of aquatic vegetation and vegetation along the banks of the ponds also. It is proposed that such activities focus on increasing the water quality of the ponds and spare the vegetation along their banks to conserve the odonate diversity they sustain.

References

Corbet, P. (1993). Are Odonata useful as bioindicators? *Libellula* 12(3–4): 91–102.

Fraser, F.C. (1933). *The Fauna of British-India including Ceylon and Burma, Odonata.* Vol. I. Taylor and Francis Ltd., London, 436pp.

Fraser, F.C. (1934). *The Fauna of British-India including Ceylon and Burma, Odonata.* Vol. II. Taylor and Francis Ltd., London, 442 pp.

Fraser, F.C. (1936). *The Fauna of British-India including Ceylon and Burma, Odonata.* Vol. III. Taylor and Francis Ltd., London, 461pp.

Greenberg, A.E., L.S. Clesceri & A.D. Eaton (1992). *Standard Methods for the Examination of Water and Waste Water (18th edition).* American Public Health Association (APHA), American Water Works Association and Environment Federation, Washington.

Janssen, A., H. Hunger, W. Konold, G. Pufal & M. Staab (2018). Simple pond restoration measures increase dragonfly (Insecta: Odonata) diversity. *Biodiversity Conservation* 27: 2311–2328. https://doi.org/10.1007/s10531-018-1539-5.

Kiran, C.G. & D.V. Raju (2013). *Dragonflies and Damselflies of Kerala* (Keralathile Thumbikal). Tropical Institute of Ecological Sciences, 156pp.

Society for Odonate Studies (2020). List of odonates of Kerala. https://odonatesociety.org/list-of-odonates-of-kerala/. Electronic version accessed on 15 July 2020.

Subramanian, K.A. (2005). *India-A Lifescape, Dragonflies of India – A Field Guide*. Vigyan Prasar, India Offset Press, New Delhi, 118pp.

Subramanian, K.A. (2009). *Dragonflies and Damselflies of Peninsular India - A Field Guide*. Vigyan Prasar, Noida, India, 168pp.

Villalobos-Jiménez, G., A.M. Dunn & C. Hassal (2016) Dragonflies and damselflies (Odonata) in urban ecosystems: a review. *European Journal of Entomology* 113: 217–232.

Acknowledgements: The authors would like to thank the Principal, Christ College, Irinjalakuda for permitting to use the laboratory and extending his wholehearted support throughout the study. The first author is grateful to the Society for Odonate Studies (SOS) for the constant support and encouragement.

A. Vivek Chandran[1], Amitha Wilson[2] & Subin K. Jose[3]

[1-3] Department of Geology and Environmental Science, Christ College, Irinjalakuda, Thrissur, Kerala 680125, India.
[1] Society for Odonate Studies, Vellooparampil, Kuzhimattom P.O., Kottayam, Kerala 686533, India.
Emails: [1]avivekchandran@gmail.com, [2]amithawilson97@gmail.com, [3]josesubin@gmail.com (corresponding author)

Citation: Chandran, A.V., A. Wilson & S.K. Jose (2020). Odonates of Irinjalakuda ponds of central Kerala, India. Bugs R All #189, In: *Zoo's Print* 35(10): 26–33.

Bugs R All is a newsletter of the Invertebrate Conservation and Information Network of South Asia (ICINSA) edited by B.A. Daniel, published with the financial support of Zoological Society of London.
For communication, Email: daniel@zooreach.org

Red-vented Bulbul breeding in Chennai: a case study

The Red-vented Bulbul *Pycnonotus cafer* (Linnaeus, 1766) is a gregarious frugivorous bird (Brooks 2013), native to tropical southern Asia and is widely distributed throughout the Indian subcontinent, tropical China, and Vietnam. It was introduced into Fiji, New Caledonia, Oman, UAE, US, and Tonga (BirdLife International 2018). *Pycnonotus cafer* prefer shrubs and trees (Kumar & Bhatt 2000), thatched houses (Dixit 1963), mud banks (Lamba 1976), and random locations such as transport buses (Urfi & Jethua 1998) for nest building. It breeds almost throughout the year, January–October (Berger 1981) with three broods per season (Long 1981). *Pycnonotus cafer* construct small, cup-shaped nests using short, dry twigs. In India, only a few studies clarify the breeding aspects of *P. cafer* (Ali 1930; Dixit 1963; Vijayan 1980). No literature on the breeding of this bird in urban Chennai exists, which justifies the present study.

Chennai city is situated along the coast of the Bay of Bengal with a human population of c. 7 million. The city experiences a maximum temperature of 35–40^{0}C in May–June and a minimum of 14^{0}C in December–January. Most of the rainfall is due to the north-east monsoon in October–December. The study site was a two-storeyed concrete house in Bharathi Street, Korattur (13.118 N & 80.193 E) within Chennai city. I located and monitored a nest of *P. cafer* during four breeding seasons from March 2016 to August 2019. In this study, I sought answers to the following questions relating to the breeding biology of Red-vented Bulbul (RVB) and its interspecific competition: (1) what is the nesting and breeding habitat of RVB in a thickly populated urban area and (2) how it interacts with another native bird House Sparrow *Passer domesticus.*

A pair of RVBs had constructed a nest in the ground floor of a two-storey concrete house at the above address since 2016. Every year a pair began arriving at the study site and built a nest between the aluminum clamps of an ornamental lamp suspended from the ceiling at 4m height from the floor. I was unable to ascertain whether the same pair was coming again and again. A staircase occurs at 2m distance from the nest and from where the nest was observed visually, supplemented by photography and videography. Every year the nest was built on the same lamp clamp. In 2019, a pair arrived in the 3rd week of March and started building a nest at the same site using dry twigs. They struggled for a week to create a base for nest in the aluminum lamp clamps. In 2019, after one week they succeeded in constructing a base on the clamp and completed the nest in five days. They reached the nest through windows and door. Between 30 March and 2 April 2019, they laid three eggs (Image 1d). Both adults

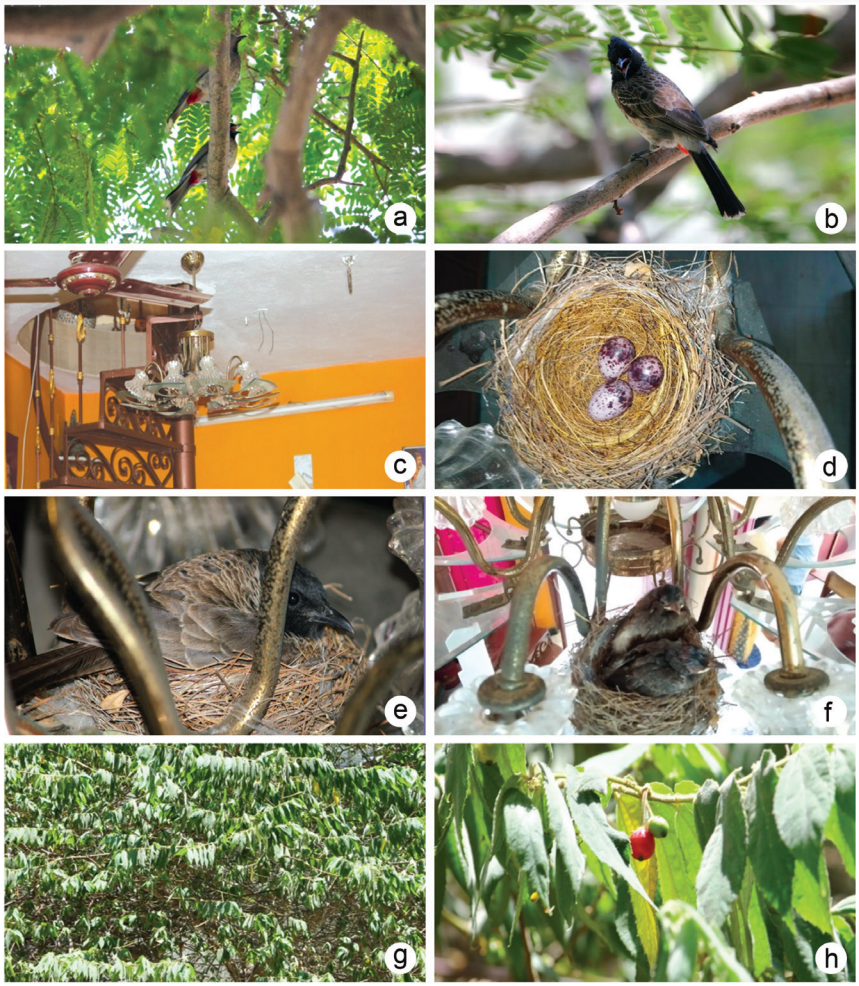


Image 1. (a) a pair of Red-vented Bulbul roost on *Peltophorum pterocarpum* tree | (b) adult individual roosts on the tree | (c) nest of Red-vented Bulbul on lamp | (d) nest containing three eggs | (e) adult bird incubating the eggs | (f) two fledgling in nest | (g) *Muntingia calabura* tree | (h) fruit of *M. calabura*.

were involved in incubating the eggs. When one bird was incubating the egg, the other bird roosted on either the lamp or window bars or on trees 100 m away from the nest. On 17 April (i.e., after the 15th day) two eggs hatched and food delivery to nestlings commenced on the next day. The fate of another egg was not known. It neither hatched nor fell down from the nest. The infertile egg was probably removed by the parents. The breeding period, eggs, hatching and fledgling details of this bird for four years is given in Table 1.

Four well-grown trees of *Muntingia calabura* (Muntingiaceae) occur within 100m radius from nesting site. Fruiting time of *M. calabura* coincides with the reproduction time of RVB. Adult birds pick up ripe red berries of *M. calabura* to feed their nestlings (Image 1g, h). Apart from fruits they occasionally feed the young ones with insects and worms. On the 9th day, both the chicks had grown well and space became a constraint. On the 13th day (30 April 2019) both the chicks flew out of the nest and moved to adjacent bushes. On 15th day one of them was dead under the bush and crows were feeding on the carcass. Another chick was not noticed in the vicinity.

On 12 June 2019, probably the same pair of RVB, came to the same nest, repaired the nest using new twigs, and reused the nest for second breeding in the same year. No other individual of *P. cafer* was noticed in the vicinity of the study sight and only two adults of RVB were found roosting on the window bars and nearby bushes. Hence I think that the same pair came again for the next round of nesting. Between 17th and

Table 1. Details of breeding of Red-vented Bulbul for four years in urban Chennai.

Year	Nesting period	No. of nesting attempts (per year)	No. of eggs laid	Incubation (in days)	No. of eggs hatched	Fledeling growth (in days)	Fledgling success
2016	March - April	1	3	15	3	14	Successfully flew
2017	March - April	1	3	15	3	14	Successfully flew
2018	March - April	1	3	15	3	14	Successfully flew
2019	March - July	1	3	15	2	13	Successfully flew but one found dead
2019	June - July	1	3	34	0	0	Breeding not successful as eggs were not hatched

19th June, they started incubating the clutch of three eggs. Incubation occurs usually for about 14 days. But residents of that house had gone out for the period between 28 and 30 June, closing the door and the windows, preventing movement of the birds to the nest. The birds attempted to enter the house through door and windows but their attempts were in vain. Again the birds resumed incubation from the 12th day, i.e., from 1 July, after a gap of three days. In view of discontinuation of incubation for three days from the 9th to the 11th days of incubation, the eggs had rotted in the nest. However, the birds continued their incubation till 23 July 2019 expecting the eggs to hatch. Finally, they abandoned the nest on the morning of 25 July 2019. The adults had incubated eggs for 34 days, except for three days, against the usual expected period of 14 days (Ali & Ripley 1996). In the present study between 2016 and 2019, the eggs hatched in 14–15 days. But during the second breeding in 2019, the birds had exhibited an unusual behaviour of incubating eggs for 34 days (Table 1).

The present observation supports the findings of Long (1981) on multiple breeding in a year. In the present study two breeding events occurred between March and July.

Interspecific Competition

Individuals of House Sparrow (HS) occurred in the vicinity of the study area. In January 2019 in order to facilitate their nesting, three artificial nest boxes were placed in and around the study area. Three pairs of HS started nest building in the third week of March 2019. At that time, a pair of RVB visited the study site and chose the nesting site on the ornamental lamp within the house attempting nest construction. Immediately after the selection of the nesting site, RVB started to chase away HS from the vicinity of former's nest. Finally, the bulbuls succeeded, and all the three pairs of sparrows fled the

nesting site and never returned to their half-built nests.

Thibault et al. (2018) had observed that the occurrence of HS was not affected by the presence of RVB in New Caledonia. But the present study suggests that inter-specific competition occurs between RVB and HS affects the HS negatively.

Conclusion

Breeding of RVB took place in the urban human residences between March and July with two breeding events. Their breeding period coincides with the fruiting season of *M. calabura* trees because these birds are frugivorous. Usually, incubation period was for 13–15 day. Unusually in 2019, there was extended incubation for 34 days as the eggs did not hatch during the normal incubation period. Inter-specific competition exists between the RVB and HS, although it needs to be verified on larger populations. Survey has to be conducted in urban Chennai to assess the exact population status of this bird.

References

Ali, S. (1930). Casualities among eggs and youngs of small birds. *Journal of Bombay Natural History Society* 34: 1062–1067.

Ali, S. & S.D. Ripley (1996). A pictorial guide to the birds of the Indian Subcontinent. Oxford University Press. 2nd Edition: 274pp.

Berger, A.J. (1981). Hawaiian birdlife. 2nd edition, University of Hawaii Press, Honolulu.

BirdLife International (2000). Threatened Birds of the World. Lynx Edicions and BirdLife International, Cambridge: 852 pp.

BirdLife International (2018). *Pycnonotus cafer*. The IUCN Red List of Threatened Species 2018: e.T22712695A132102224. https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22712695A132102224.en. Downloaded on 14 October 2020.

Brooks, D.M. (2013). Ecology, behaviour and reproduction of an introduced population of Red-vented Bulbuls (*Pycnonotus cafer*) in Houston, Texas. *Wilson Journal of Ornithology* 125(4): 800–808.

Dixit, D. (1963). Notes on a case of Red-vented Bulbul (*Pycnonotus cafer* L.) nesting indoors. *Pavo* 1: 19–31.

Kumar, A. & D. Bhatt (2000). Vocal signals in a tropical avian species with Red-vented Bulbul *Pycnonotus cafer*: Their characteristics and importance. *Journal of Bioscience* 25: 387–396.

Lamba, B.S. (1976). Red-vented Bulbul *Pycnonotus cafer* nesting in a hole in a mud bank. *Journal of Bombay Natural History Society* 73(2): 395.

Long, J.L. (1981). Introduced Birds of the world. *Agricultural Protection Board of Western Australia*: 21–493.

Thibault, M., E. Vidal, M.A. Potter, J. Sanchez & F. Brescia (2018). The Red-vented Bulbul (*Pycnonotus cafer*) outnumbers native birds in a tropical biodiversity hotspot. *PLOS ONE* 13 (2): e0192249.

Urfi, A.J. & K. Jethua (1998). Unusual nest location of Redvented Bulbul *Pycnonotus cafer* (Linn.). *Journal of Bombay Natural History Society 95: 116.*

Vijayan, V. S. (1980). Breeding biology of bulbuls, *Pycnonatus cafer* and *Pycnonotus luteolus* (Class: Aves, Family: Pycnonotidae) with special reference to their ecological isolation. *Journal of Bombay Natural History Society* 75: 1090–1117.

Acknowledgements: I thank Oviya Arivarasu, M. Punniyakotti, A. Giridharan and Frank Sadrack for data collection and photography and Dr. Azad Rahmani for pre-final editing of the draft.

M. Pandian
No. F1901, TAISHA, near Natesan Nagar, Virugambakkam, Chennai, Tamil Nadu 600092, India. Email: pandian.m14@gmail.com

Citation: Pandian, M. (2020). Red-vented Bulbul breeding in Chennai: a case study. Bird-o-soar #55, In: *Zoo's Print* 35(10): 34–37.

First sighting of Blossom-headed Parakeet from southern West Bengal

We have been documenting the changes of nature in the forest ecosystems to forest edge villages of West Medinipur District of southern West Bengal. During our continuous morning survey on 14 June 2020, we spotted a parakeet near Mugbasan Village with a rosy head. At a glance we thought it to be the Plum-headed Parakeet but soon realized it was different. We took many photographs but were unable to take the tail portion because of positional disadvantages. When the bird flew away we found there was another one with it hidden among the tree foliage (Arjan *Holoptelia integrifolia*). We used a binocular (Olympus 10×50) along with Canon DSLR and Nikon P900 for photography. We consulted the literature for the proper identification of the birds (Grimmett et al. 2016; Praveen et al. 2018).

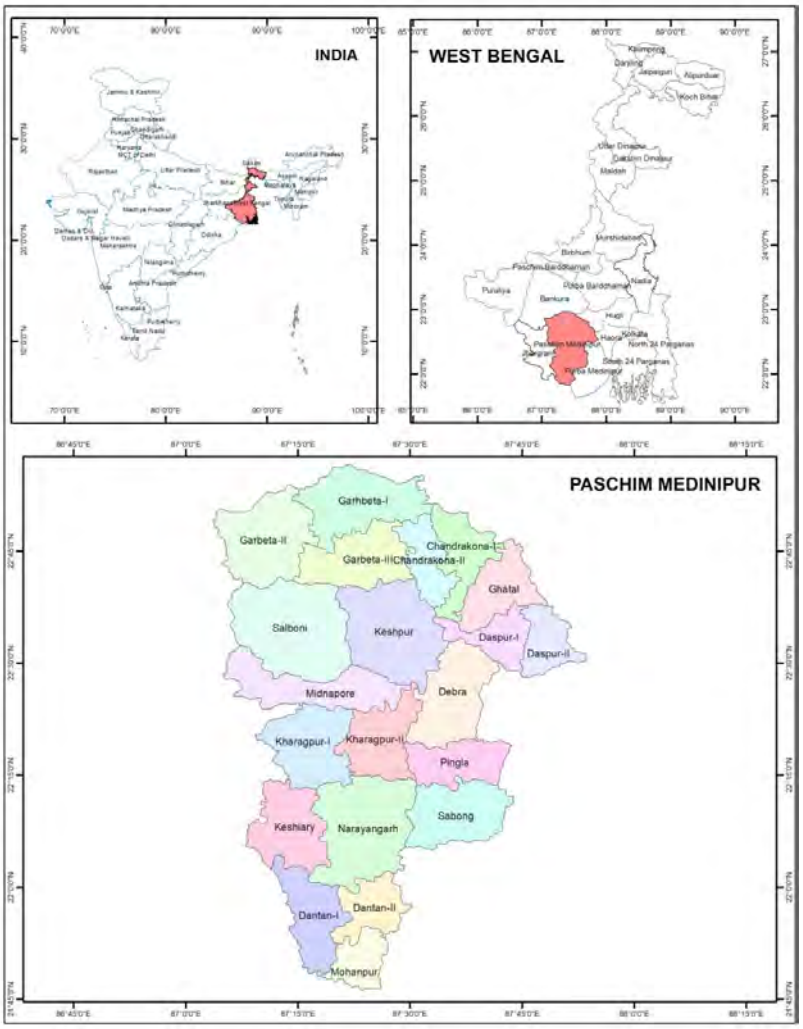
A sub adult male Blossom-headed Parakeet

Male Blossom-headed Parakeets *Psittacula roseata* are distinguished from male Plum-headed Parakeets *Psittacula cyanocephala* by paler pink and lilac blue on head (Grimmett et al. 2016), rosy pink ear coverts, pale purplish-blue nape and crown with black chin strap graduating to fine stripe around the hind neck (Grewal 2016). Orangish-yellow upper mandible is seen in Blossom-headed Parakeets only (Grewal 2016).

Flight is quick and agile, particularly when treading trees (Arlott 2014). They prefer open light forest, secondary growth, and plantations. Blossom-headed Parakeets are less noisy than Plum-headed

Table 1. Birds found during the survey.

	Common name	Scientific name	IUCN (3.1)
1	Little Cormorent	*Microcarbo niger*	LC
2	Lesser Whistling Duck	*Dendrocygna javanica*	LC
3	Little Grebe	*Tachybaptus ruficollis*	LC
4	Gadwall	*Mareca Strepera*	LC
5	Eurasian Coot	*Fulica atra*	LC
6	Pheasant-tailed Jacana	*Hydrophasianus sp.*	LC
7	Bronzed-winged Jacana	*Metopidius indicus*	LC
8	Eurasian Moorhen	*Gallinula chlropus*	LC
9	White-breasted Waterhen	*Amaurornis phoenicurus*	LC
10	Asian Openbill Stork	*Anastomus oscitans*	LC
11	Common Kingfisher	*Alcedo atthis*	LC
12	White-throated Kingfisher	*Halcyon smyrnensis*	LC
13	Pied Kingfisher	*Ceryle rudis*	LC
14	Stork-bill Kingfisher	*Pelargopsis capensis*	LC
15	Common Sandpiper	*Actitis hypoleucos*	LC
16	Green Sandpiper	*Tringa ochropus*	LC
17	Wood Sandpiper	*Tringa glareola*	LC
18	Small Pratincole	*Glareola lacteal*	LC
19	Temminck's Stint	*Calidris temminckii*	LC
20	Common Green Shank	*Tringa nebularia*	LC
21	Common Snipe	*Gallinago gallinago*	LC
22	Painted Snipe	*Rostratula benghalensis*	LC
23	Kentish Plover	*Charadrius alexandrinus*	LC
24	Little-ringed Plover	*Charadrius dubius*	LC
25	Great Egret	*Ardea alba*	LC
26	Little Egret	*Egretta garzetta*	LC
27	Intermediate Egret	*Ardea intermedia*	LC
28	Cattle Egret	*Bubulcus ibis*	LC
29	Pond Heron	*Ardeola grayii*	LC
30	Purple Heron	*Ardea purpurea*	LC
31	Black-crowned Night Heron	*Nycticorax nycticorax*	LC
32	Cinnamon Bittern	*Ixobrychus cinnamomeus*	LC
33	Black Bittern	*Ixobrychus flavicollis*	LC
34	Yellow Bittern	*Ixobrychus sinensis*	LC
35	Grey Wagtail	*Motacilla cinereal*	LC
36	Yellow Wagtail	*Motacilla flava*	LC
37	White Wagtail	*Motacilla alba*	LC
38	White-browed Wagtail	*Motacilla maderaspatensis*	LC
39	Citrine Wagtail	*Motacilla citreola*	LC
40	Yellow-wattled Lapwing	*Vanellus malabaricus*	LC
41	Red-wattled Lapwing	*Vanellus indicus*	LC
42	Grey-headed Lapwing	*Vanellus cinereus*	LC
43	Blyth's Pipit	*Anthus godlewskii*	LC
44	Paddyfield Pipit	*Anthus rufulus*	LC
45	Olive-backed Pipit	*Anthus hodgsoni*	LC
46	Tree Pipit	*Anthus trivialis*	LC
47	Pale Sand Martin	*Riparia diluta*	LC
48	Eurasian Hoopoe	*Upupa epops*	LC
49	Ashy-crowned Sparrow Lark	*Eremopterix griseus*	LC
50	Bengal Bush Lark	*Mirafra assamica*	LC
51	Short-toed Lark	*Alaudala cheleensis*	LC
52	Oriental Skylark	*Alauda arvensis*	LC
53	Jerdon's Bush Lark	*Mirafra affinis*	LC
54	Plain Prinia	*Prinia inornate*	LC
55	Scaly-breasted Munia	*Lonchura* sp.	LC
56	Tricolour Munia	*Lonchura mallacca*	LC
57	Red Avadavat	*Amandava* sp.	LC
58	Grey Frankolin	*Francolinus* sp.	LC



Study area and location map of the present study. From top left: State west Bengal in the country map, District West Midnapore in State map, and Center one is Block map of Midnapore.

Parakeets. Blossom-headed Parakeets are resident of northeastern India, northern West Bengal and Bangladesh. E-Bird shows its distribution in northeastern India, Bangladesh (with one record from Bangladesh Sunderbans), Nepal, Bhutan, Thailand, and Vietnam. Blossom-headed Parakeets are frequently spotted in Assam, India. There was no previous record of Blossom-headed Parakeets from southern West Bengal. We took help from two ornithologists of Zoological Society of India to confirm our identification.

As Blossom-headed Parakeets look little identical with related Plum-headed Parakeets, these two birds are frequently misidentified. Moreover, our photo is of a sub adult male Blossom-headed Parakeet. We started our survey in November 2019 and continued through the winter.

References

Arlott, N. (2014). *Birds of India* (Collin's Field Guide). William Collin, London, 400pp.

E- Bird. https://ebird.org/species/blhpar3 Accessed on 21 June 2020.

Grewal, B., S. Sen, S. Singh, N. Devasar & G. Bhatia (2016). *A Pictorial Field Guide to Birds of India, Pakistan, Nepal, Bhutan, Sri Lanka and Bangladesh.* Om Books International, New Delhi, 791pp.

Grimmett, R., C. Inskipp & T. Inskipp (2016). *Birds of the Indian Subcontinent*. Bloomsbury Publishing India Pvt Ltd, New Delhi, 528pp.

Praveen, J., R. Jayapal & A. Pittie (2018). Taxonomic updates to the checklist of birds of India and the south Asian region. *Indian Birds* 14(2): 37–42.

Acknowledgements: We thank Dr. Gopinathan Maheswaran, of Bird Section, ZSI, Kolkata and Dr. Anil Kumar of ZSI, NRC, Dehradun for confirming our Blossom-headed Parakeet identification.

Suman Pratihar[1], Niloy Mandal[2] & Kaushik Deuti[3]
[1&2] Sukumar Sengupta Mahavidyalaya, Keshpur, West Medinipur, West Bengal 700016, India.
[3] Zoological Survey of India, 27 JL Nehru Road, Kolkata, West Bengal 700016, India.
Email: pratihar_vu@rediffmail.com (corresponding author)

Citation: Pratihar, S., N. Mandal & K. Deuti (2020). First sighting of Blossom-headed Parakeet from southern West Bengal. Bird-o-soar #56, In: *Zoo's Print* 35(10): 38–40.

White-rumped Vulture nestling predation by stray dog in Madhya Pradesh, India

Stray dog (puppy) feeding on a White-rumped Vulture chick in Hinota Village, in Chandla Tehsil of Chhatarpur District, Madhya Pradesh, India.

IUCN Status: Critically Endangered (BirdLife International 2020).

Aves [Class of birds]
Accipitriformes [Order of includes most of the diurnal birds of prey]
Accipitridae [hawks, eagles, kites, harriers, and Old World vultures]
Gyps bengalensis [White-rumped Vulture]
Species described by Gmelin in 1788

Global Distribution: White-rumped Vulture occurs in Pakistan, India, Bangladesh, Nepal, Bhutan, Myanmar (Burma), Thailand, Laos, Cambodia, and southern Vietnam. It formerly occurred in southern China and Malaysia but is now extinct in those countries. It has also been found in southern and central Afghanistan, mostly in the southern area but has also been sighted in the central part of Afghanistan.

Indian Distrubution: Was very common on the Indian subcontinent.

Population size: 2,500–9,999 (Birdlife International 2020).

White-rumped Vultures are often found in cities, towns and villages, near human habitation. They occur in temperate areas, mostly in plains and occasionally in hilly regions. *Gyps bengalensis* is generally found in open areas and fields enclosing scattered trees. This species qualifies as **Critically Endangered** because it has suffered an extremely rapid population decline primarily as a result of feeding on carcasses of animals treated with the veterinary drug Diclofenac.

The White-rumped Vulture (WRV) was one of the most common bird of prey in the Indian subcontinent (Huston 1985). The population of the WRV and other resident *Gyps* vulture species has declined very rapidly since the mid-1990s across the Indian subcontinent (Prakash 1999; Gilbert et al. 2006; Prakash et al. 2007; Chaudhary et al. 2012). The rate of decline in the population of WRV has exceeded 99.9% in India (Prakash et al. 2007) and the species is classified as Critically Endangered (BirdLife International 2020). Predation on nestlings of Old World vultures is reported very scantily (Brown & Amadon 1968; Mundy 1982). Only very sporadic observations have been made on the predation on fledglings by mammalian species (Rodriguez & Balcells 1968; Donazar & Ceballos 1988). In this note, we report the stray dog's predation on fledgling of WRV in Hinota Village located in Chandla Tehsil of Chhatarpur District, Madhya Pradesh, India.

On 26 February 2018, while monitoring WRV nesting colony in Hinota Village, we observed a stray dog (puppy) feeding on the chick of WRV under the nesting tree and when we approached nearer to see the chick, it was already dead. In that nesting colony a total of 30 chicks were observed from 2017 to 2018 breeding season. A similar kind of observation was made by Samson et al. (2016) who reported Wild Boar predation on WRV chick in Jagalikadavu nesting areas of Sigur Plateau, Mudumalai Tiger Reserve, Tamil Nadu. In Bulgaria, Stoyanov & Stefanov (1993) reported 10 incidents of Egyptian Vulture chick predation in the nesting area by Golden Eagle, Eagle Owl, Jackal, Red Fox, and Wolves and also 12 unsuccessful attempts by Golden Eagles and Common Raven. All of these observations have been reported in the nesting habitat of WRV and Egyptian Vulture. In WRV, there is extensive parental care shown and the chicks are fully grown and independent within 5–6 months of nursing and fledge therafter (Narojii 2006). WRV is a highly social bird and builds its nests near the human settlements (Narojii 2006). The population of WRV crashed by 99.9% in India due to the severe effects of Diclofenac, a NSAID used to treat cattle (Prakash et al. 2007). Currently, the estimated population of vulture in India is 2,500–9,999 individuals (Birdlife International 2020).

In India, vulture conservation effort is highly prioritized and captive breeding programmes for WRV are going on that look forward to release them back into the wild. In the present scenario there is a very small population of wild vultures breeding in certain areas of India. During the breeding season, effective monitoring of colonies especially the ones situated near to human habitation is extremely important for successful breeding in their natural habitat (Samson & Ramakrishnan 2020).

It is very important to record the observation of feeding of stray dogs on WRV chicks in the natural habitat, even though it is an opportunistic one, should be scientifically documented for future reference (Samson et al. 2016). It's necessary to identify the breeding colonies and effective monitoring is highly required especially in breeding seasons.

References

BirdLife International (2020). Species factsheet: *Gyps bengalensis*. Downloaded from http://www.birdlife.org on 05/09/2020.

Brown, L. & D. Amadon (1968). *Eagles, Hawks and Falcons of the World*. 2 Vols. Country Life Book, Feltham, Middlesex.

Chaudhary, A., T.R. Subedi, J.B. Giri, H.S. Baral, B. Bidari, H. Subedi, B. Chaudhary, I. Chaudhary, K. Paudel & R.J. Cuthbert (2012). Population trends of Critically Endangered *Gyps* vultures in the lowlands of Nepal. Bird Conservation International 22(3): 270–278; http://dx.doi.org/10.1017/S0959270911000426

Donazar, J.A. & O. Ceballos (1988). Red Fox predation on fledgling Egyptian Vultures. *Journal Raptor Research* 22(3): 88.

Gilbert, M., R.E. Green, S. Ranade, S. Saravanan, D.J. Pain, V. Prakash & A.A. Cunningham (2006). Rapid population declines and mortality clusters in three Oriental White-backed Vulture *Gyps bengalensis* colonies in Pakistan due to diclofenac poisoning. *Oryx* 40: 388–399. https://doi.org/10.1017/S0030605306001347

Houston, D.C. (1985). Indian White-backed Vulture (*Gyps bengalensis*), pp. 456–466. In Newton, I.; Chancellor, R.D. (eds.). *Conservation Studies of Raptors*. International Council for Bird Preservation, Cambridge, U.K.

Marlow, B.J. (1982). Predation by the ratel *Mellivora capensis* on chicks of the White-backed Vulture (*Gyps africanus)*. *South African Journal of Wildlife Research* 13: 24

Mundy, P. (1982). *The comparative biology of Southern African Vultures*. Vulture Study Group, Johannesburg.

Naoroji, R. (2006). *Birds of Prey of the Indian subcontinent*. Om Book international, India, 692pp.

Prakash, V. (1999). Status of vultures in Keoladeo National Park Bharatpur Rajasthan with special reference to population crash in *Gyps* species. *Journal of the Bombay Natural History Society* 3: 365–378.

Prakash, V., R.E. Green, D.J. Pain, P. Ranades, S. Saravanan, N. Venki & A.A. Cunningham (2007). Recent changes in population of resident *Gyps* vultures in India. *Journal of the Bombay Natural History Society* 104: 129–135.

Rodriguez-Jimenez, F.L. & E. Balcells (1968). Notas biologicas sobre el alimoche (*Neophron percnopterus*) en el Alto Aragon. *Publ. Centro Pir. Biol. Exp*. 2: 159–187.

Samson, A. & B. Ramakrishnan (2020). The Critically Endangered White-rumped Vulture *Gyps bengalensis* in Sigur Plateau, Western Ghats, India: population, breeding ecology, and threats. *Journal of Threatened Taxa* 12(13): 16752–16763. https://doi.org/10.11609/jott.3034.12.13.16752-16763

Samson, A., B. Ramakrishnan & P. Ravi (2016). Wild Boar predation on White-rumped Vulture fledgling. *Zoos Print* 31(8): 8.

Stoyanova, Y. & N. Stefano (1993). Predation upon nestling Egyptian Vultures (*Neophron percnopterus*) in the Vratsa Mountains of Bulgar. *Journal Raptor Research*. 27(2): 123

Hemant Bajpai[1] & Arockianathan Samson[2]
[1&2] Vulture Conservation and Breeding Programme, Bombay Natural History Society, Mumbai, Maharashtra 400001, India.
Email: [2]kingvulture1786@gmail.com (corresponding author)

Citation: Bajpai, H. & A. Samson (2020). White-rumped Vulture nestling predation by stray dog in Madhya Pradesh, India. Bird-o-soar #57, In: *Zoo's Print* 35(10): 41–43.

Call for donations

In the first phase of the fundraiser for the **Sally Walker Conservation Fund**, we target three objectives.

(i) **The Sally Walker Lifetime Award for Conservation** — The first award is proposed for 12 October 2020 on Sally's birth anniversary.

(ii) **The Sally Walker Training Programme in Conservation Biology and Application** — The first workshop to train young biologists and foresters is planned for the third week of March 2020.

(iii) **Communicating Science for Conservation through innovative education programs** — A series of outreach programs for the rural kids in the districts adjoining the Western Ghats in Tamil Nadu are being planned for in 2020.

We solicit your generous contributions to the above activities of your choice. Please log onto our website www.zooreach.org and click on the **SWCF page** for information on how to donate.

You can also click here to go directly to the donation page.

Donations by Indians
Donations by non Indians

In case you wish to know more about the **Sally Walker Conservation Fund,** please contact Dr. Sanjay Molur by email <sanjay@zooreach.org> or by phone +91 9677822997.

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.

Publication Information

ZOO'S PRINT, ISSN 0973-2543
Published at: Coimbatore

Owner: Zoo Outreach Organisation, 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road, Saravanampatti, Coimbatore, Tamil Nadu 641035, India.

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.

Address
Zoo Outreach Organisation
Post Box 5912, 12, Thiruvannamalai Nagar,
Saravanampatti - Kalapatti Road, Saravanampatti,
Coimbatore, Tamil Nadu 641035, India
Phone: +91 9385339862 & 9385339863
E-mail: zooreach@zooreach.org
Website: www.zoosprint.zooreach.org,
www.zooreach.org

ZOOREACH
ZOO OUTREACH ORGANIZATION