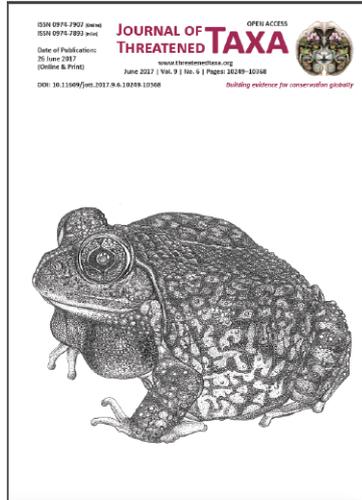


OPEN ACCESS



The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.



Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

SHORT COMMUNICATION

OCCURRENCE AND CONSERVATION OF THE INDIAN LEOPARD (MAMMALIA: CARNIVORA: FELIDAE: *PANTHERA PARDUS*) IN COX'S BAZAR DISTRICT OF BANGLADESH

M. Tarik Kabir, M. Farid Ahsan & Ayesha Khatoon

26 June 2017 | Vol. 9 | No. 6 | Pp. 10320–10324

10.11609/jott.1898.9.6.10320–10324



For Focus, Scope, Aims, Policies and Guidelines visit http://threatenedtaxa.org/About_JoTT

For Article Submission Guidelines visit http://threatenedtaxa.org/Submission_Guidelines

For Policies against Scientific Misconduct visit http://threatenedtaxa.org/JoTT_Policy_against_Scientific_Misconduct

For reprints contact info@threatenedtaxa.org

Partner



Publisher/Host





ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

OCCURRENCE AND CONSERVATION OF THE INDIAN LEOPARD (MAMMALIA: CARNIVORA: FELIDAE: *PANTHERA PARDUS*) IN COX'S BAZAR DISTRICT OF BANGLADESH

M. Tarik Kabir¹, M. Farid Ahsan² & Ayesha Khatoun³

OPEN ACCESS



¹ Wildlife and Biodiversity Conservation Officer, Wildlife Management and Nature Conservation Division, Rajshahi, Bangladesh

² Department of Zoology, University of Chittagong, Chittagong, Bangladesh

³ Department of Statistics, University of Chittagong, Bangladesh

¹ bankmyna_chapai@yahoo.com (corresponding author), ² faridahsan55@yahoo.com, ³ ayeshatanna@yahoo.com

Abstract: A study on the occurrence and conservation measures of the Indian Leopard (*Panthera pardus* Meyer, 1794) was carried out between July 2012 and March 2014, through direct visual observation and sign survey. This study was an opportunistic finding during biodiversity survey of the Inani Reserved Forest in Cox's Bazar District of Bangladesh. The Indian leopard is a less known carnivore species, which has no recent confirmed record in Bangladesh. Direct observation in one place and the pugmark of leopards were identified from three places of the Inani Reserved Forest. Maximum and minimum length, and width of the pugmark were 8.7cm and 8.2cm, and 8.7cm and 7.1cm respectively; range of length of heel pad was 5.5cm to 5.0cm. There was only one sighting record and roaring/growling like haw-a-haw-ahaw howling was also heard once during the field visits. Illegal encroachments, fire, fuel and timber wood collections, beetle-leaf vineyard, and wildlife poaching are major identified threats for the conservation of the biodiversity of Inani Reserved Forest.

Keywords: Carnivores, Cox's Bazar South Forest Division, Inani, mammals, pugmark.

Bangladesh is a country of rich biodiversity due to its zoogeographical position in between Indo-Himalayan and Indo-Burma sub-regions. It harbours 120 species of mammals, of which more than eight species have been exterminated (Ahmed et al. 2009). Carnivores constitute

one of the major groups of mammals and contain 28 species in Bangladesh (Ahmed et al. 2009; Khan 2010). Family Felidae includes eight species (Ahmed et al. 2009.) of which the Indian Leopard (*Panthera pardus* Meyer, 1794) is the smaller of the two big cat species found here. The other member of big cat family in Bangladesh is the Bengal Tiger *Panthera tigris tigris*. The Leopard is a Critically Endangered species in Bangladesh (IUCN Bangladesh 2003) and Vulnerable globally (Stein et al. 2016).

The range of the leopard includes some parts of Africa, tropical Asia from Siberia, South and West Asia to across the most of Sub-Saharan Africa (Sunquist & Sunquist 2002). The Indian Leopard is one of the nine subspecies of leopard (Uphyrkina et al. 2001). It is distributed all over India, Nepal, Bhutan, and Bangladesh, some parts of Pakistan and Myanmar (Pocock 1939). There is no recent confirmed sighting record of the Indian Leopard in Bangladesh. Khan (1982, 2008, 2010), Sarker & Sarker (1988), and Asmat (2009) reported the presence of the species in the remote areas of Chittagong Hill Tracts without any sighting records. In India, studies have been

DOI: <http://doi.org/10.11609/jott.1898.9.6.10320-10324> | **ZooBank:** <urn:lsid:zoobank.org:pub:71E8E11E-A929-4525-B5EA-71FBD3245CB>

Editor: P.O. Nameer, Kerala Agricultural University, Thrissur, India.

Date of publication: 26 June 2017 (online & print)

Manuscript details: Ms # 1898 | Received 22 June 2016 | Final received 29 May 2017 | Finally accepted 08 June 2017

Citation: Kabir, M.T., M.F. Ahsan & A. Khatoun (2017). Occurrence and conservation of the Indian Leopard (Mammalia: Carnivora: Felidae: *Panthera pardus*) in Cox's Bazar District of Bangladesh. *Journal of Threatened Taxa* 9(6): 10320–10324; <http://doi.org/10.11609/jott.1898.9.6.10320-10324>

Copyright: © Kabir et al. 2017. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

Funding: Self-funded.

Competing interests: The authors declare no competing interests.

Acknowledgements: The authors are grateful to M Abdullah Abu Diyan, GIS consultant and free lance wildlife habitat conservationist of Bangladesh for continuous help and inspiration in the field. He also gave us company during field visits. We also acknowledge thanks to local people and respective Forest Department for providing consistent help in the field.

done on population ecology and conservation issues of leopard (e.g., Ramakrishnan et al. 1999; Athreya et al. 2011; Harihar et al. 2011).

MATERIALS AND METHODS

Study area

Inani Reserved Forest is the southern-most forested area of Bangladesh which is situated about 10km far away from Myanmar border (Fig. 1). It includes the six forest beat offices under Inani and Ukhia forest ranges. This forest is controlled and managed by Cox's Bazar South Forest Division. Remnants and degraded small patches of natural vegetation of Cox's Bazar South Forest Division still exist at Inani. Total area of Ukhia and Inani ranges are 8,612ha and 8,157ha respectively, but the actual forest coverage is much less than the occupied land area. It is dominated by small to medium hills and hillocks with an elevation less than 100m above sea level (Akter et al. 2009). Soils are sandy to sandy-loam in highlands and clay to silty-clay in depressions (Akter et al. 2009). Garjan (*Dipterocarpus* spp.), Bailam *Anisoptera scaphula* and Civit *Swintonia floribunda* are the major tree species of this forest belt. Most of these tree species have been exterminated but a few trees are still found at the periphery of the forest. Other important tree species are Shegun *Tectona grandis*, Lohakat *Xylia dolabiformis*, Hargoza *Dillenia pentagyna*, Chalta *Dillenia*

indica, Chickrassi *Chickrassia tabularis*, Jam *Syzygium* spp., Uri-am *Mangifera longipes*, Figs *Ficus* spp., Jarul *Lagerstoemia speciosa*, Bahera *Terminalia bellirica*, Pitraj *Ammora wallichii*, Batna *Quercus* sp., Gutgutia *Protium serratum*, Koroi *Albizia* spp., Moase *Brownlowia elata*, Chapalish *Artocarpus chama*, Kanchon Vadi *Aldrovanda vesiculosa* and Shimul *Salmalia malabarica*.

Methods

The present study was carried out between July 2012 and March 2014. It was part of a biodiversity survey for the conservation of the Inani Reserved Forest conducted using the three selected transects. The length of transects were 2.5, 3.0 and 4.0 km respectively for transect 1, 2 and 3. The survey was conducted one day for each transect in every month from 6.00 AM to 11.00 AM and rest of the time of the day spent for the opportunistic findings during the study period. Observers spent 66 days in the field which covered 209 km. One to four local people assisted during the field visits. Inani Reserved Forest is dominated by hills. So, hill streams/creeks were used as transects (Ahsan 1984). Pugmarks of leopard beside the hills and streams were carefully studied and photographic evidence was recorded for further study. Measurements of the pugmarks were taken according to Sanei et al. (2011). Threats and conservation measures were determined through focus group discussions with

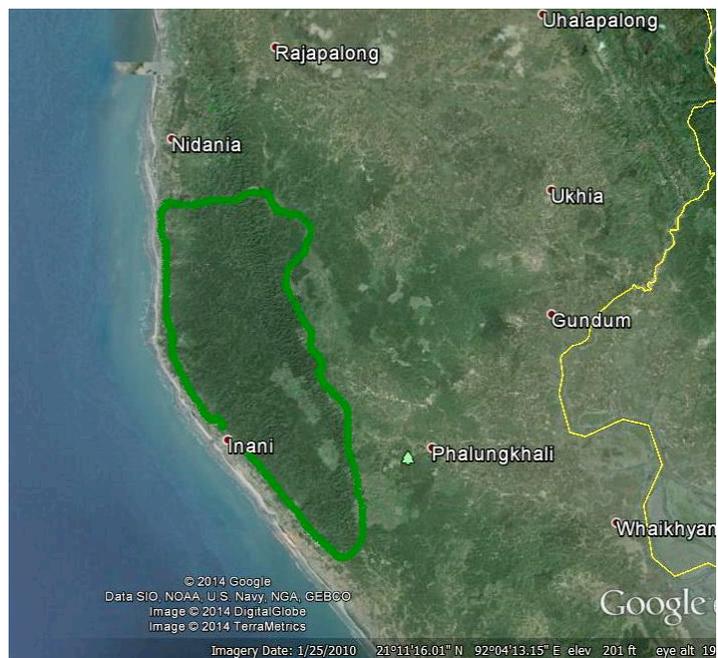
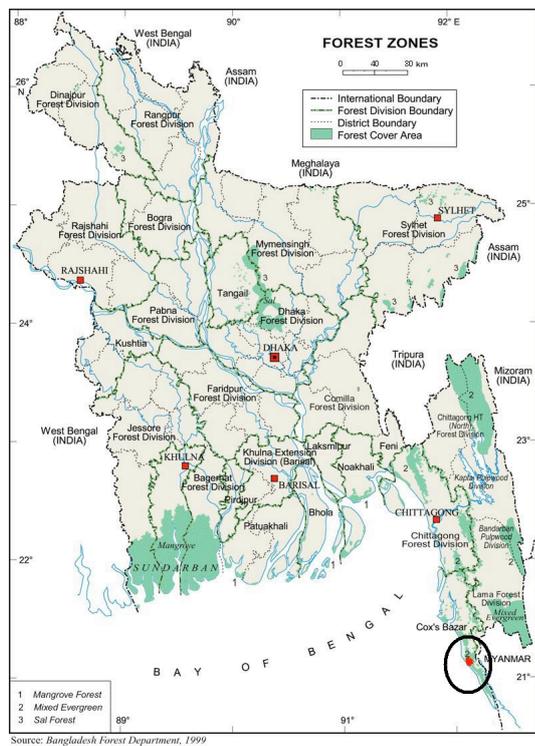


Figure 1. Map of Bangladesh (left, red dot inside the black circle indicates the leopard sighting areas) and habitat of the leopard at Inani Reserved Forest inside the green boundary (right).

local people from 30 to 70 ages of male participants in an open discussion and direct field observations.

RESULTS

The presence of Indian Leopard was confirmed through direct observation and tracing of pugmarks. Pugmarks were seen in three places: Bairuntali, Garjania and Jummapara of the Inani Reserved Forest (Image 1). Fresh pugmarks were traced beside hill streams at Bairuntali (21.18370556 N & 92.06805556 E) and Garjania (21.21778056 N & 92.06722222 E) and old pugmarks were traced at Jummapara (21.18367778N & 92.06805556E). The distance between Jummapara and Bairuntali is about 3km but Garjania is about 15km away from Bairuntali. We were able to measure the pugmarks from the two former places.

The length of two pugmarks of the front legs on the sandy-clay streambeds were 8.6cm and 8.7cm (Table 1). It was more or less circular. Heel pad was curved inwardly and the second toe was extended forward (Images 1 & 2). Length of the heel pads of the front leg pugmarks were 5.5cm and 5.3cm.

There was only one sighting record of the leopard in this study. In the early morning of 12 January 2014, a leopard was seen for a few seconds to cross a small stream covered by thickly undergrowth at Dolubania (21.21700556 N & 92.066944444 E) of the Inani Reserved Forest. After 5-6 minutes of encounter, observers heard sawing like haw-a-haw-ahaw (howling) sound from about 85m away of a thick bush. Observers could not see the pugmarks from the encountering site due to hard soil condition. Local people informed us that three cattle were killed by a leopard between January and March 2014.

Illegal encroachments, timber and fire wood collections, beetle-leaf vineyards are the major threats to the habitat of wildlife at Inani Reserved Forest (M Tarik Kabir pers. comm. 12.v.2014). Twenty-one major entry points in the forest were marked, through which local forest dependant people usually enter to fulfill their demands. Approximately, 138 people (n = 3) enter the forest daily within a 10km area between Inani



Image 1. Pugmarks of first sightings at Beruntali of Inani Reserved Forest



Image 2. Pugmark of second sighting of leopard at Garjania of Inani Reserved Forest.

Table 1. Measurements of pugmarks of the Indian leopard at Inani Reserve Forest

| Pugmark | Length (cm) | | Width (cm) | | Length of heel pad (cm) | | Width of heel pad (cm) | |
|---------|-------------|-----|------------|-----|-------------------------|-----|------------------------|-----|
| | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| Front | 8.6 | 8.7 | 8.7 | 8.1 | 5.5 | 5.3 | 4.4 | 4.3 |
| Hind | 8.2 | 8.6 | 7.6 | 7.1 | 5.3 | 5.0 | 4.3 | 4.2 |

and Dakchhara. Beetle-leaf vineyards are a financially profitable agro-product for the local community and there are about 650 vineyards in and around the forest. People collect the stems of saplings of various species of trees and use them as poles for the beetle-leaf vineyards. Illegal hunting by indigenous/tribal and local people was also observed. Hunting and signs of hunting (i.e., trap, body parts of dead animals) of Red Jungle Fowl *Gallus gallus*, Kalij Pheasant *Lophura leucomelanos*, Wild Boar *Sus scrofa*, Porcupine *Hystrix indica*, Barking Deer *Muntiacus muntjak*, Rhesus Macaque *Macaca mulatta* and Pig-tailed Macaque *M. leonina* were seen during the field visits. Footprints and sightings of these animals were also recorded in the study area. These wild animals may form part of the natural prey of the leopard in that forest.

DISCUSSION

Khan (2008), Asmat (2009) and Khan (2010) mentioned the presence of the leopard in remote areas of the Chittagong Hill Tracts without any sighting record

of their own or any specific sighting location, although pugmarks of the leopard were seen in the Chunati Reserved Forest (now called Chunati Wildlife Sanctuary) in 1981 (M. Farid Ahsan pers. comm. 12.ii.2014). None of the authors cited the occurrence of the species in Cox's Bazar District. A few field researchers observed the sign and evidence of the presence of the leopard from northeastern and southeastern Bangladesh. But there is no confirmed sighting record of the leopard in Bangladesh. Leopard pugmark being seen in three places in the Inani Reserved Forest signifies the presence of the species in that area. Chowdhury et al. (2007) studied the traditional forest fauna harvesting by the Mro tribe in remote areas of Bandarban District and concluded that the leopard was seen rarely 5–10 years ago, but is not found today.

Sanei et al. (2011) studied the leopard in Malaysia and mentioned the length and width of the pugmarks of front legs were 7.25–12.02 cm and 6.17–12.94 cm respectively. The pugmark length of an adult leopard would range from 7–9.5 cm (Talwar & Usmani 2005). On the other hand, the length of a full grown leopard pugmark is 7.5–11 cm and heel pad length 4–7.5 cm (Henschel & Ray 2003).

Identified habitat of the Indian leopard is highly degraded at the Inani Reserved Forest. A few small to medium height trees are present at the Bairuntali and Garjania, while Jummapara is totally covered with thick undergrowth of *Lantana camara* and other invasive species. Athreya et al. (2013) studied the presence of the leopard in human dominated areas in India and found the evidence of the adaptation of the carnivores in a cropland landscape which is devoid of any wild herbivore. It has also the ability to adapt to an extremely human modified landscape (Odden et al. 2014). Akhter et al. (2009) mentioned that all villagers largely depend on local forest resources in Inani Reserve Forest. Illegal encroachments and poaching are the major threats of the Inani Reserved Forest (Rahman & Mannan 2011). Around 2000 people enter into the forest through 57 points everyday illegally (Rahman & Mannan 2011). The presence of Rohingya refugees from Myanmar (Burma) is another major threat there (Khan et al. 2012). They are temporarily settled at Kutupalong Refugee Camps and inside the forest, and are dependent on the forest for their daily needs (Kabir 2012). Myanmar is approximately 15 km far away from the location of the sighting. Possibly the leopard is using the habitat corridor between Inani Reserved Forest and Myanmar.

The Indian leopard is possibly on the verge of local extirpation in Bangladesh. Urgent steps should be

taken to determine the population, ecology and habitat corridor of the species at Inani Reserved Forest as well as Chittagong Hill Tracts. Threats to the leopard should be minimized by strengthening manpower and regular patrolling by the concerned forest officials and by creating Alternative Income Generation (AIG) and awareness among the local peoples.

REFERENCES

- Ahsan, M.F. (1984). Study of Primates in Bangladesh: Determination of Population Status and Distribution of Non-human Primates in Bangladesh with Emphasis on Rhesus Monkey. MPhil Thesis. University of Dhaka, Dhaka, xiii+148pp+viii.
- Ahmed, A.T.A., S.M.H. Kabir, M. Ahmad, Z.U. Ahmed, Z.N.T. Begum, M.A. Hassan & M. Khondker (eds.) (2009). *Encyclopedia of Flora and Fauna of Bangladesh. Vol. 27. Mammals*. Asiatic Society of Bangladesh, Dhaka, 263pp.
- Akhter, S., M.S. Islam, M.P. Rana & M. Alamgir (2009). Impact of forest and non-forest villagers on Ukhia and Inani Forest Range under Cox's Bazar (South) Forest Division, Bangladesh. *Proceedings of the Pakistan Academy of Science* 46(1): 13–22.
- Asmat, G.S.M. (2009). *Panthera pardus* (Linnaeus, 1758), pp. 114–115. In: Ahmed, A.T.A., S.M.H. Kabir, M. Ahmad, Z.U. Ahmed, Z.N.T. Begum, M.A. Hassan & M. Khondker (eds.). *Encyclopedia of Flora and Fauna of Bangladesh. Vol. 27. Mammals*. Asiatic Society of Bangladesh, Dhaka, 264pp.
- Athreya, V., M. Odden, J.D.C. Linnell, J. Krishnaswamy & U. Karanth (2011). Translocation as a Tool for Mitigating Conflict with Leopards in Human-Dominated Landscapes of India. *Conservation Biology* 25(1): 133–141; <http://doi.org/10.1111/j.1523-1739.2010.01599.x>
- Athreya, V., M. Odden, J.D.C. Linnell, J. Krishnaswamy & U. Karanth (2013). Big cats in our backyards: persistence of large carnivores in a human dominated landscape in India. *PLoS ONE* 8(3): e57872; <http://doi.org/10.1371/journal.pone.0057872>
- Chowdhury, H., M.A. Halim, M.D. Mia, N. Muhammed & M. Koike (2007). Biodiversity use through harvesting faunal resources from forests by the Mro tribes in the Chittagong Hill Tracts, Bangladesh. *International Journal of Biodiversity Science and Management* 3(1): 56–62.
- Harihar, A., B. Pandav & S.P. Goyal (2011). Responses of leopard *Panthera pardus* to the recovery of a tiger *Panthera tigris* population. *Journal of Applied Ecology* 48: 806–814; <http://doi.org/10.1111/j.1365-2664.2011.01981.x>
- Henschel, P. & J. Ray (2003). *Leopards in African Rainforests: Survey and Monitoring Technique*. WCS Global Carnivores Programs, 50pp.
- IUCN Bangladesh (2003). *Bangladesher Bipanno Bannoprani (in Bangla)*, IUCN-The World Conservation Union, Dhaka, xiv+294pp.
- Kabir, M.T. (2012). Primates of Cox's Bazar District of Bangladesh with Special Reference to Ecology of the Dwindling Long-tailed Macaque. Unpublished MPhil thesis, University of Chittagong, Chittagong, xv+94pp.
- Khan, M.A.R. (1982). *Wildlife of Bangladesh: A Checklist*. The University of Dhaka, Dhaka, 173pp.
- Khan, M.A.R. (2010). *Wildlife of Bangladesh: A Checklist (from Amphibia to Mammalia) with Bengali Names*. Shahitya Prakash, Dhaka, 128pp.
- Khan, M.M.H. (2008). *Protected Areas of Bangladesh - A Guide to Wildlife*. Nishorgo Program, Bangladesh Forest Department, Dhaka, 304pp.
- Khan, M.A.S.A., M.A. Uddin & C.E. Haque (2012). Rural livelihoods of Rohingya refugees in Bangladesh and their impacts on forests: The case of Teknaf Wildlife Sanctuary. <https://www.researchgate.net/publication/236903099>. Downloaded on 11 February 2015.
- Odden, M., V. Athreya, S. Rattan & J.D.C. Linnell (2014). Adaptable neighbours: movement patterns of GPS-collared Leopards in human

- dominated landscapes in India. *PLoS ONE* 9(11): e112044; <http://doi.org/10.1371/journal.pone.0112044>
- Pocock, R.I. (1939).** *The Fauna of British India, Including Ceylon and Burma. Mammalia- Vol. 1.* Taylor and Francis, London, 463pp.
- Rahman, M.A. & A. Mannan (2011).** Challenge of forest law enforcement in Bangladesh with special reference to proposed Inani National Park. *Proceedings of the First Bangladesh Forestry Congress*, 84-87pp.
- Ramakrishnan, U., R.G. Coss & N.W. Pelkey (1999).** Tiger decline caused by the reduction of large ungulate prey: evidence from a study of leopard diets in southern India. *Biological Conservation* 89(2): 113–120; [http://doi.org/10.1016/S0006-3207\(98\)00159-1](http://doi.org/10.1016/S0006-3207(98)00159-1)
- Sanei, A., M. Zakaria, E. Yusof & M. Roslan (2011).** Estimation of leopard population size in a secondary forest within Malaysia's capital agglomeration using unsupervised classification of pugmarks. *Tropical Ecology* 52(2): 209–217.
- Sarker, M.S.U. & N.J. Sarker (1988).** *Wildlife of Bangladesh (A Systematic list with Status, Distribution and Habitat).* The Rico Printer, Dhaka, 69pp.
- Stein, A.B., V. Athreya, P. Gerngross, G. Balme, P. Henschel, U. Karanth, D. Miquelle, S. Rostro-Garcia, J.F. Kamler, A. Laguardia, I. Khorozyan & A. Ghoddousi (2016).** *Panthera pardus.* (errata version published in 2016) The IUCN Red List of Threatened Species 2016: e.T15954A102421779. Downloaded on 17 May 2017.
- Sunquist, M. & F. Sunquist (2002).** *Wild Cats of the World.* The University of Chicago Press, Chicago and London, 452pp.
- Talwar, R. & A. Usmani (2005).** *Reading Pugmark - A Pocket Book for Forest Guards.* Published by Tiger & Wildlife Programme, WWF India, 54pp.
- Uphyrkina, O., W.E. Johnson, H. Quigley, D. Miquelle, L. Marker, M. Bush & S.J. O'Brien (2001).** Phylogenetics, genome diversity and origin of modern leopard, *Panthera pardus.* *Molecular Ecology* 10: 2617–2633; <http://doi.org/10.1046/j.0962-1083.2001.01350.x>





OPEN ACCESS



The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

June 2017 | Vol. 9 | No. 6 | Pages: 10249–10368

Date of Publication: 26 June 2017 (Online & Print)

DOI: 10.11609/jott.2017.9.6.10249-10368

www.threatenedtaxa.org

Articles

Co-occurrence patterns of fish communities in littorals of three floodplain lakes of the Orinoco River, Venezuela

-- Gabriela E. Echevarría & Nirson González, Pp. 10249–10260

Genetic diversity of the Green Turtle (Testudines: Cheloniidae: *Chelonia mydas* (Linnaeus, 1758)) population nesting at Kosgoda Rookery, Sri Lanka

-- E.M.L. Ekanayake, T. Kapurusinghe, M.M. Saman, D.S. Rathnakumara, P. Samaraweera & R.S. Rajakaruna, Pp. 10261–10268

Identity of *Sphaerotheca pluvialis* (Jerdon, 1853) and other available names among the burrowing frogs (Anura: Dicroglossidae) of South Asia

-- Neelesh Dahanukar, Shauri Sulakhe & Anand Padhye, Pp. 10269–10285

***Sphaerotheca pashchima*, a new species of burrowing frog (Anura: Dicroglossidae) from western India**

-- Anand Padhye, Neelesh Dahanukar, Shauri Sulakhe, Nikhil Dandekar, Sunil Limaye & Kirti Jamdade, Pp. 10286–10296

Population status and species diversity of wetland birds in the Rapti and Narayani rivers and associated wetlands of Chitwan National Park, Nepal

-- Bed Bahadur Khadka, Paras Mani Acharya & Sunil Lal Rajbhandari, Pp. 10297–10306

Communications

Wildlife hunting by indigenous people in a Philippine protected area: a perspective from Mt. Apo National Park, Mindanao Island

-- Krizler Cejuela Tanalgo, Pp. 10307–10313

Pupal shape and size dimorphism in *Aedes albopictus* (Skuse, 1894) (Diptera: Culicidae)

-- Elvira Sánchez, Daniel Castillo & Jonathan Liria, Pp. 10314–10319

Short Communications

Occurrence and conservation of the Indian Leopard (Mammalia: Carnivora: Felidae: *Panthera pardus*) in Cox's Bazar District of Bangladesh

-- M. Tarik Kabir, M. Farid Ahsan & Ayesha Khaton, Pp. 10320–10324

A checklist of the avian fauna of Chittagong University campus, Bangladesh

-- M. Tarik Kabir, M. Farid Ahsan, M. Mizanur Rahman & M. Manirul Islam, Pp. 10325–10333

Diversity and new records of intertidal hermit crabs of the genus *Clibanarius* (Crustacea: Decapoda: Diogenidae) from Gujarat coast off the northern Arabian Sea, with two new records for the mainland Indian coastline

-- Pradip Kachhiya, Jatin Raval, Pares Poriya & Rahul Kundu, Pp. 10334–10339

Notes

Four species of Commelinaceae, as additions to Andhra Pradesh, India

-- S. Salamma, M. Chennakesavulu Naik, M. Anil Kumar, A. Sreenath & B. Ravi Prasad Rao, Pp. 10340–10344

Trematode infestation in coral colonies at Poshitra Reef, Gulf of Kachchh Marine National Park, Gujarat, India

-- D. Adhavan, R. Chandran, S. Tikadar & K. Sivakumar, Pp. 10345–10346

First report of *Mantibaria mantis* (Dodd) (Hymenoptera: Scelionidae: Scelioninae) from India and additional descriptors for the species

-- Kamalanathan Veenakumari & Prashanth Mohanraj, Pp. 10347–10350

A new record of *Tenodera fasciata* (Olivier, 1792) (Insecta: Mantodea: Mantidae: Mantinae) for western India

-- Gopal Ambrushi Raut & Sunil Madhukar Gaikwad, Pp. 10351–10354

First records of butterflies *Anthene emolus emolus* (Godart, [1924]) (Lepidoptera: Lycaenidae: Polyommatainae) and *Gandaca harina assamica* Moore, [1906] (Lepidoptera: Pieridae: Coliadinae) from Kumaon, Uttarakhand, India

-- Sanjay Sondhi, Pp. 10355–10357

A new locality record of the rare Anomalous Nawab *Polyura agrarius* (Swinhoe, 1887) (Lepidoptera: Nymphalidae: Charaxinae) from central India

-- Deepika Mehra, Jagatjot Singh Flora & Vivek Sharma, Pp. 10358–10360

Taxonomic note about Willow Ermine Moth *Yponomeuta rorrellus* Hübner (Lepidoptera: Yponomeutidae) from Ladakh division of Jammu & Kashmir, India

-- Mudasir Ahmad Dar, Shahid Ali Akbar & Govindasamy Mahendiran, Pp. 10361–10364

First record of hagfish (Cyclostomata: Myxiniidae) in Indian waters

-- B. Fernholm, A. Biju Kumar & Michael Norén, Pp. 10365–10368

zoo!
Z Ü R I C H

**WILD
ZOO**
Threatened Taxa