Building evidence for conservation globally

Journal of Threatened Taxa

10.11609/jott.2022.14.5.20951-21126
www.threatenedtaxa.org

26 May 2022 (Online & Print)
14(5): 20951-21126
ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

Open Access

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

Publisher
Wildlife Information Liaison Development Society
www.wild.zooreach.org

Host
Zoo Outreach Organization
www.zooreach.org

No. 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road, Saravanampatti,
Coimbatore, Tamil Nadu 641035, India
Ph: +91 9385339863 | www.threatenedtaxa.org
Email: sanjay@threatenedtaxa.org

For Focus, Scope, Aims, and Policies, visit https://threatenedtaxa.org/index.php/JoTT/aims_scope
For Article Submission Guidelines, visit https://threatenedtaxa.org/index.php/JoTT/about/submissions
For Policies against Scientific Misconduct, visit https://threatenedtaxa.org/index.php/JoTT/policies_various

continued on the back inside cover

Cover: Dorsal view of Mantis Shrimp *Cloridina ichneumon* (Fabricius, 1798) & *Gonodactylellus demanii* (Henderson, 1893). © Fisheries Research Station, Junagadh Agricultural University, Sikka.

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 May 2022 | 14(5): 20964–20969

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

https://doi.org/10.11609/jott.7758.14.5.20964-20969

#7758 | Received 22 November 2021 | Final received 21 February 2022 | Finally accepted 09 May 2022

OPEN ACCESS

COMMUNICATION

Cases of fatal electrocution of the endangered Javan Gibbons (Mammalia: Primates: Hylobatidae) by power lines

Yoonjung Yi [1], Soojung Ham [2], Rahayu Oktaviani [3], Mia Clarissa Dewi [4], Muhammad Nur [5], Ani Mardiastuti [6] & Jae. C. Choe [7]

[1] Laboratory of Animal Behaviour and Conservation, College of Biology and the Environment, Nanjing Forestry University, No.159 Longpan Road, Nanjing, 210037, Jiangsu China.

[1,2,7] Division of EcoScience, Ewha Womans University, 52, Ewhayeodae-gil, Seodaemun-gu, Seoul, 03760, Republic of Korea.

[3,5] Javan Gibbon Research and Conservation Project, Kampung Citalahab Sentral, Desa Malasari, Kecamatan Nanggung, Bogor, Jawa Barat 16650, Indonesia.

[3] Yayasan Konservasi Ekosistem Alam Nusantara (KIARA), Komplek Laladon Indah, Jl. Kamojang C4/15, Laladon, Ciomas, Bogor, Jawa Barat 16610, Indonesia.

[4] Universitas Yuppentek Indonesia, Jl. Perintis Kemerdekaan I No.1, RT.007/RW.003, Babakan, Kec. Tangerang, Kota Tangerang, Banten 15118, Indonesia.

[6] Department of Forest Resources Conservation and Ecotourism, Faculty of Forestry and Environment, IPB University, Jl. Raya Dramaga, Babakan, Kec. Dramaga, Kota Bogor, Jawa Barat 16680, Indonesia.

[1] yi.yoonjung@gmail.com (corresponding author), [2] soojungham@gmail.com, [3] rahayu_oktaviani@yahoo.com, [4] miaclarissa@gmail.com, [5] nuy011088@gmail.com, [6] aniipb@indo.net.id, [7] jaechoe9@gmail.com

Abstract: Human-made structures are often deadly to wildlife. Power lines from electric poles can cause serious injury and even death of wildlife via electrocution, especially of arboreal primate species that can easily access power lines. Here, we reported three cases of wild 'Endangered' Javan Gibbons *Hylobates moloch* electrocuted by power lines along a road between a tea plantation and a village adjacent to Gunung Halimun-Salak National Park area, West Java, Indonesia. In all cases, the adult male Javan Gibbons jumped and grabbed a power line hanging at the edge of the forests and immediately died. Our case reports highlight that power lines can have a critically adverse effect on the survival of wild animals, particularly on highly arboreal species such as Javan Gibbons. We argue the need for mitigation plans (e.g., cable insulation) for power lines in areas at risk. Such areas should be determined based on wildlife habitat monitoring and the study of ranging behaviors, focusing on areas with high risks of electrocution.

Keywords: Anthropogenic mortality, arboreal primates, human-made structures, *Hylobates moloch,* power lines.

Indonesian abstract: Infrastruktur buat an manusia seringkali mematikan bagi satwa liar. Sengatan listrik dari tiang listrik dapat menyebabkan cedera serius dan bahkan kematian bagi satwa liar, terutama spesies primata arboreal yang dapat dengan mudah meraih jaringan listrik. Kami melaporkan tiga kasus owa jawa (*Hylobates moloch*) liar yang tersengat listrik oleh jaringan listrik yang melewati daerah perbatasan antara perkebunan teh dan Taman Nasional Gunung Halimun-Salak, Jawa Barat, Indonesia. Pada ketiga kasus tersebut, owa jawa jantan dewasa melompat dan menangkap jaringan listrik yang tergantung di tepi hutan, dan langsung mati. Laporan kasus kami ini membuktikan bahwa aliran listrik dapat memiliki dampak negatif, tidak hanya di daerah perkotaan tetapi juga di alam liar, terutama pada spesies arboreal seperti owa jawa. Oleh karena itu, diperlukan rencana mitigasi (misalnya menambahkan isolator pada kabel) untuk jaringan listrik pada areal yang berisiko mencelakai satwa liar. Areal tersebut perlu dikenali berdasarkan pemantauan habitat satwa liar dan pengamatan daerah jelajah, dengan fokus pada areal dengan risiko tinggi untuk tersengat listrik.

Editor: H.N. Kumara, Sálim Ali Centre for Ornithology and Natural History, Coimbatore, India. **Date of publication:** 26 May 2022 (online & print)

Citation: Yi, Y., S. Ham, R. Oktaviani, M.C. Dewi, M. Nur, A. Mardiastuti & J.C. Choe (2022). Cases of fatal electrocution of the endangered Javan Gibbons (Mammalia: Primates: Hylobatidae) by power lines. *Journal of Threatened Taxa* 14(5): 20964–20969. https://doi.org/10.11609/jott.7758.14.5.20964-20969

Funding: The present research has been supported by the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2021R1A6A3A03039709) to YY and Amore Pacific Academic and Cultural Foundation (AACF). YY is supported by the Foreign Youth Talent Program (QN2021014010L) from the Ministry of Science and Technology and Research Grants (2021K310C) from Department of Human Resources and Social Security of Jiangsu Province of the People's Republic of China.

Competing interests: The authors declare no competing interests.

Author details & **Author contributions:** See end of this article.

Acknowledgements: This project was conducted in collaboration with the IPB University and Ewha Womans University. We thank the Indonesian Ministry of Research and Technology (RISTEK), the Indonesian Ministry of Environment and Forestry (KLHK), and the Gunung Halimun-Salak National Park (GHSNP) for the research permissions. We thank Amael Borzee for helpful comments on the manuscript.

INTRODUCTION

Human-made structures often disconnect and fragment the habitat of wildlife animals, negatively impacting their survival and potentially leading species to local extirpation (Rudolphi et al. 2014; Warner et al. 2021). Electric poles, a power line element, are one of the human-made facilities that can be deadly to various animal species. A power line can cause immediate death by electrocution or serious injuries when touched simultaneously with another non-electric current object or a wire with a different voltage (Kumar & Kumar 2015; Schulze et al. 2016). Although bird electrocutions are well documented and studied (Loss et al. 2014; Pérez-García et al. 2017), arboreal mammal species such as primates are also especially vulnerable given their high accessibility to the power lines (Moore et al. 2014; Kumar & Kumar 2015; Katsis et al. 2018).

Considering electrocutions of primates, several long-term studies reported that 32 to 40% of them eventually died after an electric shock from a power line (*Macaca mulatta*: Kumar & Kumar 2015; *Alouatta guariba clamitans*: Lokschin et al. 2007; *Semnopithecus vetulus vetulus*: Roscoe et al. 2013). The most extended study from 1998 to 2019 in Kenya found 73% of the death is due to electrocution in four monkey species (Cunneyworth & Slade 2021). In addition, electrocution was the reason for 36% of deaths observed in Hanuman langurs in Jodhpur, India (*Semnopothecus entellus entellus*; Ram et al. 2015) and 16% of four primate species in Kenya (*Colobus angolensis palliates*, *Cercopithecus mitis albogularis*, *Chlorocebus pygerythrus hilgerti*, & *Papio cynocephalus cynocephalus*: Cunneyworth et al. 2021). These results suggest that electrocution contributes highly to mortality in primates, especially in urban areas where humans and wildlife co-exist.

Java is the most heavily populated island of Indonesia with more than 140 million people while also hosting various wildlife habitats. Due to the continued deforestation in Java, less than 10% of forests remain, and the remnant is also heavily fragmented (Nijman 2004, 2013). Gunung Halimun-Salak National Park (GHSNP) has the largest remaining forest blocks in Java and it is the host to high biodiversity (MacKinnon & MacKinnon 1986). These areas can provide ecological services not only to wildlife but also to humans. However, throughout the year, with the increasing growth rate of the human population, infrastructure like roads and power lines are traversing areas close to the conservation area and could cause negative effect on wildlife.

The Javan Gibbon *Hylobates moloch* is an 'Endangered' primate and the main threats are deforestation and hunting for pet trade (Nijman 2020). While around 4,000 Javan Gibbons are left in the wild, GHSNP holds between 900 and 1,221, the largest remaining wild population (Nijman 2004; Supriatna 2006). Similar to other gibbon species, Javan Gibbons are highly arboreal, spending most of their time in the canopies (Cheyne 2011). As a result of their movement through brachiation, gibbons are at high risk of electrocution when electric poles are installed in their habitats. Several electrocution of gibbons have been reported in the media (The Wildlife Trade Monitoring Group 2020; The Straits Times 2019; Zon Pann Pwint 2019), but rarely in the scientific literature (Talukdar et al. 2018). In this study, we report and describe three cases of electrocuted wild Javan Gibbons in 2011, 2015, and 2021 at the edge of the forest close to GHSNP.

METHODS

Study site

The Javan Gibbon is one of the three key species of GHSNP, along with Javan Leopards *Panthera pardus melas* and Javan Hawks *Nisaetus bartelsi*. In addition to Javan Gibbons, the endemic Javan Lutung *Trachypithecus mauritius* and the endangered Javan Surili *Presbytis comata* are also found in the National Park. While GHSNP supports one of the largest Javan Gibbon populations, their habitats are still fragmented due to deforestation and human facilities (Smith et al. 2017). The field site in Citalahab is also located on the edge of primary forests and is surrounded by tea plantations and rice paddies (Yi et al. 2020).

Study subject

The Javan Gibbon Research & Conservation Project (JGRCP) began in 2007 in Citalahab area in GHSNP (-6.739167 S, 106.530000 E), with a focus on behavior and ecology of wild Javan Gibbons (Kim et al. 2012; Ham et al. 2017; Oktaviani et al. 2018; Yi et al. 2020; Jang et al. 2021). The home ranges of the gibbon groups that are regularly followed by the research team are located along the tea plantation, separated by a one-lane dirt road. We expect a similar habitat shared with human facilities for other gibbon groups in GHSNP. Given the long-term research going on in the area, local people are aware of Javan Gibbons and therefore direct threats towards the gibbons are relatively low compared to other habitats.

Data collection

The observations of electrocuted Javan Gibbons were

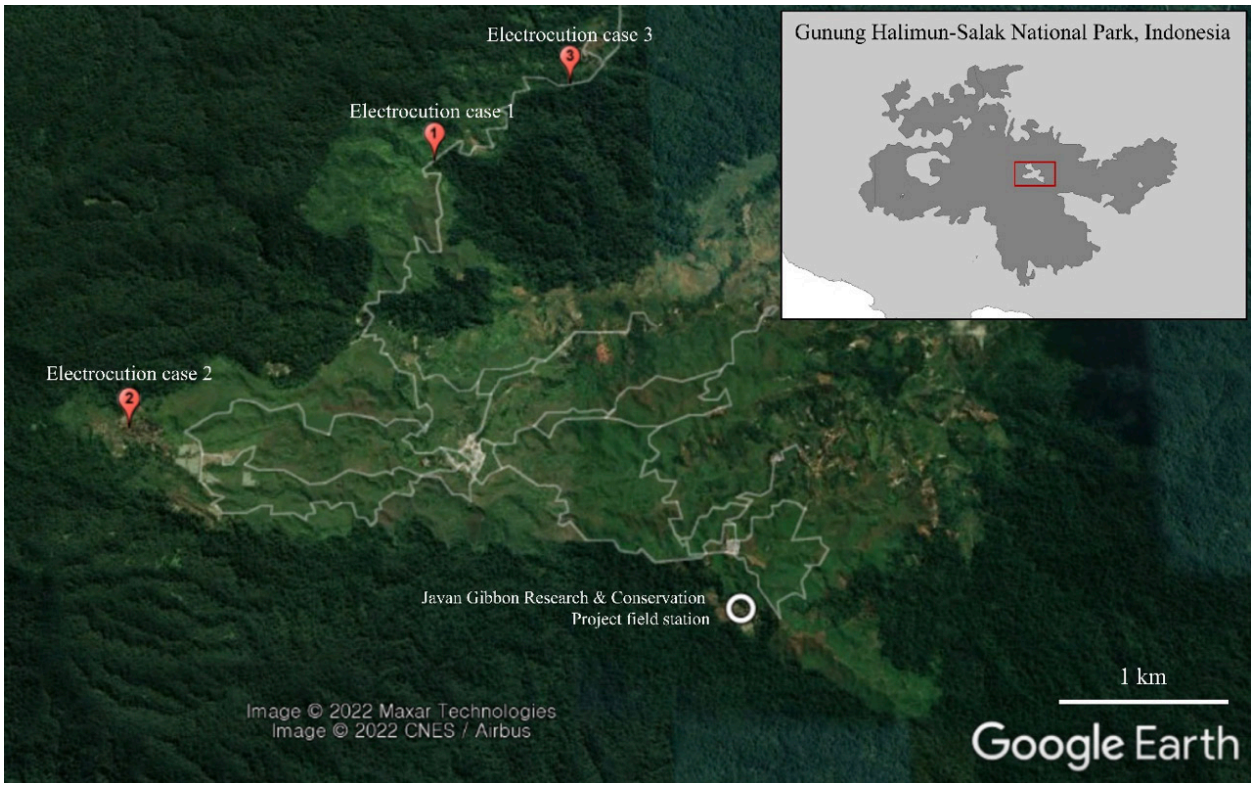

Image 1. The location of three electrocuted gibbons and the Javan Gibbon Research and Conservation Project field station on the map.

opportunistic, temporarily matching within the frame of the long-term research project. We collected the date, location and context of the electrocution events.

RESULTS

We observed three cases of electrocution of Javan Gibbons on power lines over the 15 years of long-term research along the road and the tea plantation adjacent to GHSNP (Image 1).

Case 1

22 February 2011: We found a dead gibbon holding a power line at Malani area (-6.710944, 106.512500). The individual had died a few days prior (pers. com. Cikaniki Research Station) and it was collected before 25 February 2011. The GHSNP staff witnessed the electrocution at the edge between forest and tea plantation. The gibbon jumped and held on to the power line unexpectedly because of a falling tree behind and was electrocuted. The dead gibbon was stuck to the power line until the GHSNP staff requested the national electricity company to turn the power off a few days later (Image 2). There was not much flesh left on the body and its head was missing after falling to the ground probably due to the electrocution and decomposition. Because of the bad condition, the GHSNP staff buried the gibbon body directly and we could not obtain further information. We suspect the dead gibbon was an adult male from the body size.

Case 2

23 March 2015: A local resident found an electrocuted gibbon close to Malani area (-6.727778, 106.493889), and suspected that human disturbance made the gibbon to jump onto the power line. The electrocuted gibbon's face and left arm which held the power line were damaged. No other gibbons were observed around at the time of electrocution. For necropsy, the body was delivered to LIPI (Indonesian Institute of Sciences) in Bogor. The individual was an adult male, with a body length of 530 mm and a weight of 5.5 kg (Image 3). Later, the specimen was deposited at the GHSNP headquarter in Kabandungan area as education material.

Case 3

13 December 2021: A local resident found an electrocuted gibbon close to Ciwalen (-6.705809, 106.521170). The right side, especially the arm and flank, of the dead gibbon were seriously damaged probably

Image 2. A Javan Gibbon *Hylobates moloch* electrocuted on a power line around Malani area (-6.710944, 106.512500) close to Gunung Halimun Salak National Park (22 February 2011). © Soojung Ham.

when touching the power lines. The residents buried the dead body close to the road. From the pictures taken by the resident, we assume the dead gibbon was an adult male.

Power line installed in the region

The voltage running through the power line is above 20 kv for main, 20 kv for medium, 220 v for low voltage. The number of wires is: three phases and three wires for medium, three phases and four wires for low voltage. All cables are horizontally arranged. Therefore, the gibbons likely held medium voltage (20 kv) cables. There is an insulator in the medium cable, however, the insulation strength is only up to 6 kv, and holding it for more than a few seconds will break the insulator and lead to death.

DISCUSSION

In this study, we described three cases of electrocution of Endangered Javan Gibbons on electric power lines along with their natural habitat. These observations highlight the effect of power lines on highly arboreal species such as Javan Gibbons. Given that these data are obtained opportunistically, there may be more actual number of electrocution cases in more remote and uninhabited areas. At the study site, some of the power lines pass along the road and inside forest patches. As a result, its presence can be a great threat to the wildlife in the forest, mainly for birds and arboreal mammals. Thus, we suspect similar but unreported cases of Javan Gibbon, or other wildlife injury or death, caused by electrocution in the study area.

While arboreal species have relatively low chances to be hit by vehicles (roadkill), power lines are easily reachable for them. Among primates in general, mortality resulting from electrocution seems to be higher in arboreal than in terrestrial species (Al-Razi et al. 2019; Cunneyworth & Slade 2021). While previous reports on primate electrocution are mostly from urban areas (Printes 1999; Goulart et al. 2010; Corrêa et al. 2018; Pereira et al. 2020), our cases indicate that power lines can cause fatality in forested areas as well. Moreover, along with the cases reported in this study, three more electrocuted gibbons were found outside the protected areas in the last four years: two cases from Gunung Gelap Garut, Cisewu between January and February 2022 (-7.370986, 107.497615; pers. com. Sigit

Image 3. A male adult Javan Gibbon *Hylobates moloch* electrocuted on a power line around Malani area (-6.727778, 106.493889) close to Gunung Halimun Salak National Park (23 March 2015). Pictures of the whole body (left), the face (top right), and the injury on the left arm due to the electrocution (bottom right). The body was collected by Muhammad Nur. © Mia Clarissa Dewi.

Ibrahim, The Aspinall Foundation, Indonesia) and one case in 2018 from Lengkong, South Sukabumi (-7.127500, 106.687222). This suggests that the endangered Javan Gibbons suffers from power line mediated electrocution both in urban and forested areas.

People living in the study site were previously isolated because there was no electricity and mobile signal before electric poles were set up in 2011–2012. Despite the benefits of offering electricity to the local community, the cases reported in the study highlight that the increase in human facilities, especially in the areas surrounding protected areas, has negative effects on wildlife. A recent study of population viability analysis revealed that Javan Gibbons might go extinct within the next 100 years if existing threats such as hunting and deforestation remain the same (Smith et al. 2017). Electrocution caused by power lines may hasten this trend. Therefore, mapping the priority areas to apply mitigation measures will be an urgent step to decrease the threats. Furthermore, a typical conservation approach to preserve Javan Gibbon populations, the distribution of power lines should be considered a relevant determinant of possible mortality risk.

With the cases reported in our study, we conclude that the installation of human infrastructures such as electric poles needs to take into account conservation management practices. First, power line installations should practically avoid the habitats of Javan Gibbons according to the mitigation hierarchy, and should follow the application of wildlife standards (Kiesecker et al. 2010). Then, mitigation efforts such as insulation or burial of electric cables, artificial canopy bridges will help lower the mortality of the species (Janss & Ferrer 1999; Katsis et al. 2018). In Sri Lanka, the electrocution cases of the Toque Macaques *Macaca sinica* significantly dropped from 18 to zero after the installation of shields on electric poles (Dittus 2020). Given the cost of mitigation efforts, it is critically important to understand habitat use and the ranging behaviors of species as well as to investigate and prioritize mitigation in high-risk areas, for instance where power lines pass along the forests. For example, mitigating actions are spatially prioritized based on the systematical analyses of spatial occurrence of electrocution in five primate species between 1998 and 2016 (Katsis et al. 2015). Wildlife Javan Gibbon electrocution mortality in areas close to GHSNP must be promptly and appropriately addressed through monitoring and conservation management practices.

REFERENCES

Al-Razi, H., M. Maria & S.B. Muzaffar (2019). Mortality of primates due to roads and power lines in two forest patches in Bangladesh. *Zoologia (Curitiba),* 36: e33540. https://doi.org/10.3897/zoologia.36.e33540

Cheyne, S.M. (2011). Gibbon locomotion research in the field: problems, possibilities, and benefits for conservation, pp. 201–213. In: D'Août, K. & E.V. Evie (eds.). *Primate locomotion*. Springer New York, NY, 364pp.

Corrêa, F.M., Ó.M. Chaves, R.C. Printes & H.P. Romanowski (2018). Surviving in the urban–rural interface: Feeding and ranging behavior of Brown Howlers (*Alouatta guariba clamitans*) in an urban fragment in southern Brazil. *American Journal of Primatology* 80(6): e22865. https://doi.org/10.1002/ajp.22865

Cunneyworth, P.M.K. & A.M. Slade (2021). Impact of Electric Shock and Electrocution on Populations of Four Monkey Species in the Suburban Town of Diani, Kenya. *International Journal of Primatology* 42(2): 171–186.

Dittus, W.P. (2020). Shields on Electric Posts Prevent Primate Deaths: A Case Study at Polonnaruwa, Sri Lanka. *Folia primatologica* 91(6): 643–653.

Goulart, V.D., C.P. Teixeira & R.J. Young (2010). Analysis of callouts made in relation to wild urban marmosets (Callithrix penicillata) and their implications for urban species management. *European Journal of Wildlife Research* 56(4): 641–649.

Jang, H., R. Oktaviani, S. Kim, A. Mardiastuti & J.C. Choe (2021). Do Javan Gibbons (*Hylobates moloch*) use fruiting synchrony as a foraging strategy? *American Journal of Primatology* 83(10): e23319. https://doi.org/10.1002/ajp.23319

Janss, G.F.E. & M. Ferrer (1999). Mitigation of raptor electrocution on steel power poles. *Wildlife Society Bulletin* 27(2): 263–273.

Katsis, L., P.M. Cunneyworth, K.M. Turner & A. Presotto (2018). Spatial patterns of primate electrocutions in Diani, Kenya. *International Journal of Primatology* 39(4): 493–510.

Kiesecker, J.M., H. Copeland, A. Pocewicz & B. McKenney (2010). Development by design: blending landscape-level planning with the mitigation hierarchy. *Frontiers in Ecology and the Environment* 8(5): 261-266.

Kim, S., S. Lappan & J.C. Choe (2012). Responses of Javan Gibbon (*Hylobates moloch*) Groups in Submontane Forest to Monthly Variation in Food Availability: Evidence for Variation on a Fine Spatial Scale. *American Journal of Primatology* 74(12): 1154–1167.

Kumar, V. & V. Kumar (2015). Seasonal electrocution fatalities in free-range rhesus macaques (*Macaca mulatta*) of Shivalik hills area in northern India. *Journal of Medical Primatology* 44(3): 137–142.

Lokschin, L.X., C.P. Rodrigo, J.N.H. Cabral & G. Buss (2007). Power lines and howler monkey conservation in Porto Alegre, Rio Grande do Sul, Brazil. *Neotropical Primates* 14(2): 76–80.

Loss, S.R., T. Will & P.P. Marra (2014). Refining estimates of bird collision and electrocution mortality at power lines in the United States. *PloS one* 9(7): e101565. https://doi.org/10.1371/journal.pone.0101565

MacKinnon, J. & K. MacKinnon (1986). *Review of the protected areas system in the Afrotropical realm*. International Union for Conservation of Nature and Natural Resources (IUCN), Gland, Switzerland, and Cambridge, UK, 259 pp.

Moore, R.S., Wihermanto & K.A.I. Nekaris (2014). Compassionate conservation, rehabilitation and translocation of Indonesian slow lorises. *Endangered Species Research* 26(2): 93–102.

Nijman, V. (2004). Conservation of the Javan Gibbon Hylobates moloch: population estimates, local extinctions, and conservation priorities. *Raffles Bulletin of Zoology* 52(1): 271–280.

Nijman, V. (2013). One hundred years of solitude: effects of long-term forest fragmentation on the primate community of Java, Indonesia, pp. 33–45, In: Marsh, L. & C. Chapman (eds.). *Primates in Fragments*. Springer. New York, 539 pp.

Oktaviani, R., S. Kim, A.N. Cahyana & J.C. Choe (2018). *Nutrient composition of the diets of Javan Gibbons (Hylobates moloch). IOP Conference Series: Earth and Environmental Science* 197(1): 012048. https://doi.org/10.1088/1755-1315/197/1/012048

Pereira, A.A., B. Dias, S.I. Castro, M.F. Landi, C.B. Melo, T.M. Wilson, G.R.T. Costa, P.H.O. Passos, A.P. Romano, M.P.J Szabó & M.B Castro (2020). Electrocutions in free-living black-tufted marmosets (*Callithrix penicillata*) in anthropogenic environments in the Federal District and surrounding areas, Brazil. *Primates* 61(2): 321–329.

Pérez-García, J.M., T.L. DeVault, F. Botella & J.A. Sánchez-Zapata (2017). Using risk prediction models and species sensitivity maps for large-scale identification of infrastructure-related wildlife protection areas: The case of bird electrocution. *Biological Conservation* 210: 334–342.

Printes, R. (1999). The Lami Biological Reserve, Rio Grande do Sul, Brazil, and the danger of power lines to howlers in urban reserves. *Neotropical Primates* 7(4): 135–136.

Ram, C., G. Sharma & L. Rajpurohit (2015). Mortality and Threats to Hanuman Langurs (*Semnopithecus entellus entellus*) in and around Jodhpur (Rajasthan). *Indian Forester* 141(10): 1042–1045.

Roscoe, C.J., M.A. de Silva, N.C. Hapuarachchi & P.R. Krishantha (2013). A new color morph of the southern purple-faced langur (*Semnopithecus vetulus vetulus*) from the rainforests of southwestern Sri Lanka. *Primate Conservation* 26(1): 115–124.

Rudolphi, J., M.T. Jönsson & L. Gustafsson (2014). Biological legacies buffer local species extinction after logging. *Journal of Applied Ecology* 51(1): 53–62.

Schulze, C., M. Peters, W. Baumgärtner & P. Wohlsein (2016). Electrical injuries in animals: causes, pathogenesis, and morphological findings. *Veterinary pathology* 53(5): 1018–1029.

Smith, J.H., T. King, C. Campbell, S.M. Cheyne & V. Nijman (2017). Modelling Population Viability of Three Independent Javan Gibbon (*Hylobates moloch*) Populations on Java, Indonesia. *Folia Primatologica* 88(6): 507–522.

Supriatna, J. (2006). Conservation programs for the endangered Javan Gibbon (*Hylobates moloch*). *Primate Conservation* (21): 155–162.

Talukdar, N.R., B. Singh & P. Choudhury (2018). Conservation status of some endangered mammals in Barak Valley, Northeast India. *Journal of Asia-Pacific Biodiversity* 11(2): 167–172.

Warner, D.A., J.M. Hall, A. Fargevieille, A.C. Hulbert, S. Tiatragul, J.E. Pruett & T.S. Mitchell (2021). Dependence on a human structure influences the extinction of a non-native lizard population after a major environmental change. *Biological Invasions* 23(3): 825–842.

Yi, Y., C. Fichtel, S. Ham, H. Jang & J.C. Choe (2020). Fighting for what it's worth: participation and outcome of inter-group encounters in a pair-living primate, the Javan Gibbon (*Hylobates moloch*). *Behavioral Ecology and Sociobiology* 74(8): 96–110.

Author details: Yoonjung Yi is a post-doctoral researcher working on behavioral ecology and sociobiology of primates and other wildlife, mainly focusing on inter-group encounters, parental care, and pair-bond. Soojung Ham is a Ph.D. scholar specializing in the singing behaviors of Javan gibbons and currently working for animal rights and welfare. Rahayu Oktaviani is a primate conservationist and a co-founder of the non-profit organization KIARA to protect Javan gibbons and conduct community engagement programs. Mia Clarissa Dewi is a lecturer and head of quality assurance in college, primarily working on conservation, environmental economics, and ethnozoological research. Muhammad Nur is a field coordinator in the Javan Gibbon Research and Conservation Project while contributing to field research and conservation education. Ani Mardiastuti is a professor who has been working on biodiversity, wildlife conservation, wildlife trade & law enforcement in Indonesia, mainly focusing on avians. Jae C. Choe is a chair professor who has been working on evolutionary biology, such as sexual selection and social evolution in insects, behavior and ecology of birds, primates, and cetaceans.

Author contributions: YY, SH, RO, MCD, MN collected data in the field; YY wrote the manuscript; SH, RO, AM, JCC revised the manuscript.

Journal of Threatened Taxa is indexed/abstracted in Bibliography of Systematic Mycology, Biological Abstracts, BIOSIS Previews, CAB Abstracts, EBSCO, Google Scholar, Index Copernicus, Index Fungorum, JournalSeek, National Academy of Agricultural Sciences, NewJour, OCLC WorldCat, SCOPUS, Stanford University Libraries, Virtual Library of Biology, Zoological Records.

NAAS rating (India) 5.64

Print copies of the Journal are available at cost. Write to:
The Managing Editor, JoTT,
c/o Wildlife Information Liaison Development Society,
No. 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road,
Saravanampatti, Coimbatore, Tamil Nadu 641035, India
ravi@threatenedtaxa.org

Journal of Threatened Taxa

www.threatenedtaxa.org

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

May 2022 | Vol. 14 | No. 5 | Pages: 20951–21126
Date of Publication: 26 May 2022 (Online & Print)
DOI: 10.11609/jott.2022.14.5.20951-21126

Communications

Drought may severely reduce the ability of wild Asian Elephants *Elephas maximus* (Mammalia: Proboscidea: Elephantidae) to resist opportunistic infections
– B.M. Chandranaik, Vardhaman Patil, D. Rathnamma, G.S. Mamatha, K.S. Umashankar, D.N. Nagaraju & S.M. Byregowda, Pp. 20951–20963

Cases of fatal electrocution of the endangered Javan Gibbons (Mammalia: Primates: Hylobatidae) by power lines
– Yoonjung Yi, Soojung Ham, Rahayu Oktaviani, Mia Clarissa Dewi, Muhammad Nur, Ani Mardiastuti & Jae. C. Choe, Pp. 20964–20969

Nesting habits of the Baya Weaver *Ploceus philippinus* (Linnaeus, 1766) in the agricultural landscape of Tindivanam, Tamil Nadu, India
– M. Pandian, Pp. 20970–20987

A checklist of avifauna from different habitats of semi-arid landscape in western parts (Mandsaur and Ratlam districts) of Madhya Pradesh, India
– Koushik Bhattacharjee & Shuvadip Adhikari, Pp. 20988–21001

Post-release growth of captive-reared Gharial *Gavialis gangeticus* (Gmelin, 1789) (Reptilia: Crocodilia: Gavialidae) in Chitwan National Park, Nepal
– Bed Bahadur Khadka, Ashish Bashyal & Phoebe Griffith, Pp. 21002–21009

Occurrence patterns of herpetofauna in different habitat types of western Terai Arc Landscape, India
– Gajendra Singh Mehra, Nakulananda Mohanty & Sushil Kumar Dutta, Pp. 21010–21018

Ichthyo-parasitological studies in northeastern India
– Arup Kumar Hazarika & Bobita Bordoloi, Pp. 21019–21024

Serosurvey of viral pathogens in free-ranging dog populations in the high altitude Trans-Himalayan region
– Chandrima Home, Ajay Bijoor, Yash Veer Bhatnagar & Abi Tamim Vanak, Pp. 21025–21031

Diversity and distribution of mantis shrimps (Arthropoda: Crustacea: Stomatopoda) in the Gulf of Kachchh, Gujarat, India
– Piyush Vadher, Hitesh Kardani & Imtiyaz Beleem, Pp. 21032–21042

Bionomics study of *Mansonia* (Diptera: Culicidae) in a filariasis-endemic area of Sedang Village, Banyuasin Regency, South Sumatra, Indonesia
– Rini Pratiwi, Chairil Anwar, Ahmad Ghiffari & Adri Huda, Pp. 21043–21054

Plant species diversity in a tropical semi-evergreen forest in Mizoram (northeastern India): assessing the effectiveness of community conservation
– S.T. Lalzarzovi & Lalnuntluanga, Pp. 21055–21067

Floristic studies on mangrove vegetation of Kanika Island, Bhadrak District, Odisha, India
– P. Poornima, Pp. 21068–21075

Two new varieties of *Russula* Pers. (Basidiomycota: Russulaceae) from Sal forests of Shiwaliks, India
– Jitender Kumar & Narender Singh Atri, Pp. 21076–21083

New additions to the lichen biota of Assam from Dhubri district, northeastern India
– Suparna Biswas, Rebecca Daimari, Pungbili Islary, Sanjeeva Nayaka, Siljo Joseph, Dalip Kumar Upreti & Pranjit Kumar Sarma, Pp. 21084–21090

Genus *Gymnopilus* (Agaricales: Strophariaceae): addditions to the agarics of India
– N.A. Wani, M. Kaur & N.A. Malik, Pp. 21091–21101

Review

Environmental DNA as a tool for biodiversity monitoring in aquatic ecosystems – a review
– Manisha Ray & Govindhaswamy Umapathy, Pp. 21102–21116

Short Communications

New record and update on the geographic distribution of the Egyptian Tomb Bat *Taphozous perforatus* (E. Geoffroy, 1818) in Cameroon
– Eric Moïse Bakwo Fils, Kingha Zebaze Jasmine Flora, Manfothang Dongmo Ervis, Manga Mongombe Aaron & Jan Decher, Pp. 21117–21121

First definite record of Collared Pratincole *Glareola pratincola* Linnaeus, 1766 (Aves: Charadriiformes: Glareolidae) from Goa, India
– Rupali Pandit, Mangirish Dharwadkar & Justino Rebello, Pp. 21122–21124

Notes

Nectar robbing by sunbirds on the flowers of *Morinda pubescens* J.E. Smith (Rubiaceae)
– A.J. Solomon Raju, S. Sravan Kumar, G. Nagaraju, C. Venkateswara Reddy, Tebesi Peter Raliengoane, L. Kala Grace, K. Punny, K. Prathyusha & P. Srikanth, Pp. 21125–21126

Publisher & Host

WILD ZOOREACH
Threatened Taxa