PROGRAM

Symposium for Indonesia-Malaysia BioAcoustics
8-10 November 2023

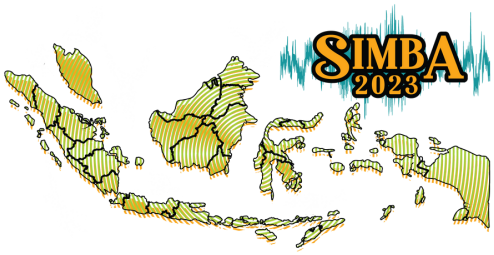
TheCornellLab
K. Lisa Yang Center for Conservation Bioacoustics

UNIVERSITAS GADJAH MADA

Universiti Malaysia Terengganu
UMT

Borneo Nature Foundation

TABLE OF CONTENTS



FOREWORD

The Symposium for Indonesia Malaysia BioAcoustics (SIMBA) is taking place at Universitas Gadjah Mada in Yogyakarta, Indonesia on November 8-10th, 2023. SIMBA marks the end of the first year of the Indonesia and Malaysia Bioacoustics Equipment & Mentorship Award program and serves as a welcoming event for the second cohort.

Background

The training program was designed to support researchers with training, mentoring, and equipment to establish conservation-oriented acoustic monitoring projects in Indonesia or Malaysia. The program was open to individuals or teams of researchers or conservationists who were interested in obtaining the training and tools necessary to launch independent acoustic monitoring programs. Connecting these researchers to equipment and training allowed us to achieve several key outcomes. First, it provides researchers with training and experience so that they are poised to implement and scale up monitoring programs as equipment becomes increasingly widespread and affordable. Second, by supplying recording units, it enables teams to collect valuable baseline data that can be used to demonstrate the conservation value of their work, potentially advancing future opportunities for grants and governmental support. Third, through training, mentorship, research experience, and engagement in regional collaboration, this program will build a strong network of local leaders who can train and mentor others across the region as equipment becomes more widely available.

In person symposium

The upcoming in-person symposium will be a celebration of our inaugural Indonesia and Malaysia Bioacoustics Equipment & Mentorship Award program, recognizing the accomplishments of our first cohort of dedicated researchers and conservationists who have successfully completed the program. During the symposium, we will showcase the achievements of the participants in scheduled talks where participants will summarize preliminary findings of their research, exchange experiences, and disseminate best practices.

The event will serve as a nexus for networking and collaboration, forging strong connections between participants of the first and second year cohorts. We believe that the symposium is not just an event but a catalyst for change, uniting passionate individuals and organizations in a shared mission to preserve the natural world through acoustic monitoring in Malaysia, Indonesia, and beyond.

SPONSOR ACKNOWLEDGEMENTS

Symposium for Indonesia-Malaysia BioAcoustics would like to deeply thank the following organisations for their financial support:

PROGRAM

Wednesday 8th November 2023

08:00 - 09:00	Registration / Light Breakfast
09:00 - 10:30	Welcome and Team Introductions
10:30 - 11:00	Coffee Break / Group Photo
11:00 - 12:30	Why Passive Acoustic Monitoring & Introduction to Digital Audio
12:30 - 14:00	Lunch Break
14:00 - 16:00	Working with SwiftOnes
16:00 - 17:30	Networking Session (BEAT participants and instructors)
17:30	End

Thursday 9th November 2023

08:00 - 09:00	Registration / Light breakfast
09:00 - 09:15	Opening Remarks: A Welcome from Dean of Faculty of Forestry UGM
09:15 - 10:00	Keynote Address 1: Dr. Wendy Erb
10:00 - 10:30	Coffee break / Group Photo

PROGRAM

Thursday 9th November 2023

ORAL PRESENTATIONS 10:30 - 12:15 Symposium 1 (10 minutes Presentation, 5 minutes Q&A)	
10:30 - 10:45	**The study of Javan Scops-owl (*Otus angelinae*) using passive acoustic monitoring in the Mount Merbabu National Park** Asman Adi Purwanto[1], Yusuf Eko Prasetyo[1], Sungkono[1], Irfan Rosyadi[2], Ign Pramana Yuda[3] 1 BISA INDONESIA, 2 Kanopi Indonesia, 3 Atma Jaya University Yogyakarta
10:45 - 11:00	**Assessment of avian species diversity in the urban landscape of Malang, Indonesia** Riri Wiyanti Retnaningtyas[1], Millenia Luna Amengka[1], Adityas Arifianto[2], Sandra Rafika Devi[3] 1 BirdPacker Indonesia, 2 Brawijaya University, 3 Universitas Gadjah Mada
11:00 - 11:15	**Passive acoustic monitoring as a long-term monitoring tool for Kenyir State Park, Malaysia: A glance into spatial and temporal patterns of variation in lar gibbon loud calls** Bryan Nesaraj George Nature Based Solutions
11:15 - 11:30	**Advancing conservation: Unveiling the vocalization of a Black Hornbill's family with Passive Acoustic Monitoring** Firman Heru Kurniawan[1,2], Riki Rahmansyah[1], Aryf Rahman[1], Mikael Raparmanto[1], Yokyok Hadiprakarsa[1] 1 Rangkong Indonesia, 2 Natural Resources and Environmental Management Science, IPB University, Bogor, West Java, Indonesia
11:30 - 11:45	**Exploring the Bioacoustics of Southeast Asian Anurans: Current Insights and Future Prospects through Passive Acoustics Monitoring** Dasi Ong, Shahriza Shahrudin Universiti Sains Malaysia

PROGRAM

Thursday 9th November 2023

11:45 - 12:00	**Creating a pathway where people with diverse backgrounds and abilities are encouraged to engage with nature through sound** Aini Hasanah Abdul Mutalib, Baizul Hafsham Badli Sham, Muhammad Fatihah Syafiq Rahman, Amirrudin Ahmad Institute of Tropical Biodiversity and Sustainable Development, Universiti Malaysia Terengganu
12:00 - 12:15	**Javan Gibbon (*Hylobates moloch*) Calling Behavior in Two Different Habitat Types in Gunung Halimun Salak National Park, Indonesia** Fauzia Yudanti[1], Rahayu Oktaviani[1], Jasmine Savitri[1], Yoonjung Yi[2], Teguh Angguh[3] 1 Yayasan Konservasi Ekosistem Alam Nusantara, Indonesia, 2 Laboratory of Animal Behavior and Conservation, College of Biology and the Environment, Nanjing Forestry University, Nanjing, China, 3 Gunung Halimun Salak National Park, Indonesia
12:15 - 12:30	Songs of Conservation: How Sound Can Tell Stories for Impact
12:30 - 14:00	Lunch break and Photo Exhibition
14:00 - 14.45	Using eBird in your Research with Ian Davies
14:45 - 17:30	Workshop 1: Strategies and Considerations for Sharing Data
17:30	End
18:30 - 20:30	Welcoming dinner at Bumbu Desa

PROGRAM

Friday 10th November 2023

08:00 - 09:00	Light breakfast and Reimbursement
09:00 - 09:45	Keynote Speaker 2: Dr. Muhammad Ali Imron
09:45 - 10:15	Coffee break with Species Imitation Competition
SESSION 10:15 - 12:30 (Symposium 2 (10 minutes presentation, 5 minutes Q&A))	
10:15 - 10:30	**Population and Distribution Mapping of the Only Naturally Hybridized Gibbon in Central Borneo, Indonesia** Jorian Akasha Hendriks Borneo Nature Foundation
10:30 - 10:45	**Sound Patterns of Plaintive Cuckoo (*Cacomantis merulinus*) at the IPB Dramaga Campus, Bogor, Indonesia** Yaumud Raiyardhi, Yeni Aryati Mulyani, Dones Rinaldi Department of Forest Resources Conservation and Ecotourism, Faculty of Forestry and Environment, IPB University
10:45 - 11:00	**Echoing Gibbon's Song to Reconnect Public Audiences with Nature** Rahayu Oktaviani[1], Fauzia Yudanti[1], Jasmine Savitri[1], Teguh Angguh[2], Yoonjung Yi[3] 1 Yayasan Konservasi Ekosistem Alam Nusantara (KIARA) 2 Gunung Halimun Salak National Park 3 Laboratory of Animal Behavior and Conservation, College of Biology and the Environment, Nanjing Forestry University
11:00 - 11:15	**Asssessment of bird species richness in urban area using passive acoustic monitoring and observational methods** Yeni Aryati Mulyani[1], Riri Wiyanti Retnaningtyas[2], Aida Fithri[3], Yaumud Raiyardhi[1], Millenia Luna Amengka[2], Adityas Arifianto[2], Dones Rinaldi[1], Ign. Pramana Yuda[4] 1 Department of Forest Resources Conservation and Ecotourism, Faculty of Forestry and Environment, IPB University 2 Birdpacker Indonesia 3 University of Syiah Kuala 4 Department Biology, University of Atmajaya Yogyakarta

PROGRAM

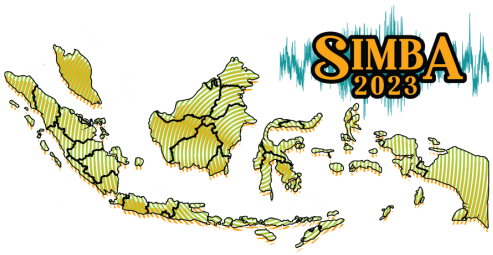
Friday 10th November 2023

11:15 - 11:30	**An Acoustic Survey of Penang Hill Biosphere Reserve Using Passive Acoustic Monitoring** Mei Yi Lee[1], Yen Yi Loo[2], Nadine Ruppert[1], Nik Fadzly N. Rosely[1] 1 School of Biological Sciences, Universiti Sains Malaysia, Pulau Pinang, Malaysia 2 Sunway Centre for Planetary Health, Sunway University, Jalan Universiti, Bandar Sunway, Petaling Jaya, Selangor, Malaysia
11:30 - 11:45	**Investigating the effect of human disturbance on endangered mammals at the Biodiversity Research and Monitoring Station of Sikundur, Gunung Leuser National Park, Sumatra** Junaydy Michael Angelo Ginting, Nursaniah, Benjamin James William Buckley, Dewi Kurnia Arianda Yayasan Ekosistem Lestari (YEL - Foundation for Sustainable Ecosystems)
11:45 - 12:00	**Transforming the potential of ecoacoustics through knowledge co-production** Frederica Poznansky[1], Rudy Arthur[1], Wendy Erb[2], Muhammad Ali Imron[3], Kristen Morrow[5], Ari Ningtyas[3], Mariatey Niun[5], Sartika Sari[5], I., Sara Thornton[4], Frank Van Veen[1] 1 University of Exeter, 2 Cornell University, 3 Universitas Gadjah Mada, 4 University of Leicester, 1 University of Georgia, 5 Universitas Muhammadiyah Palangka Raya
12:00 - 12:15	**Investigating the effectiveness of ecoacoustics as a conservation tool in island tropical ecosystems in Penang, Malaysia** Yen Yi Loo[1], Mei Yi Lee[2] 1 Sunway Centre for Planetary Health, Sunway University, Jalan Universiti, Bandar Sunway, Petaling Jaya, Selangor, Malaysia 2 School of Biological Sciences, Universiti Sains Malaysia, Persiaran Sains, Gelugor, Pulau Pinang, Malaysia

PROGRAM

Friday 10th November 2023

12:15 - 12:30	**Lesson Learnt from A Bioacoustic Training for Indonesian Students** Jasmine Alimah Savitri[1], Rahayu Oktaviani[1], Fauzia Yudanti[1], Teguh Angguh[2], Yoonjung Yi[3] 1 Yayasan Konservasi Ekosistem Alam Nusantara (KIARA), Bogor, Jawa Barat, Indonesia 2 Gunung Halimun Salak National Park, Sukabumi, Jawa Barat, Indonesia 3 Laboratory of Animal Behavior and Conservation, College of Biology and the Environment, Nanjing Forestry University, Nanjing, China
12:30 - 14:00	Lunch break
14:00 - 17:00	Workshop 2: Shaping the Future of PAM in Indonesia and Malaysia
17:00 - 17:30	Closing ceremony
17:30	End



KEYNOTE SPEAKERS

Dr. Wendy Erb

Co-creating a "sound" future for conservation in Southeast Asia

Wendy Erb
Cornell University

Abstract
Despite housing some of the richest biodiversity hotspots on Earth, the tropical forests of Indonesia and Malaysia are experiencing rapid degradation amplified by climate change. Such escalating pressures threaten wide-ranging changes for ecosystems, communities, and biodiversity across the region, and the need to understand, mitigate, and respond to these impacts is critical. Bioacoustics is a rapidly developing field with tremendous potential to inform conservation of the region's tropical forests and the human and non-human communities who rely on them. However, limited access to equipment and training opportunities are significant barriers to the development of conservation bioacoustics in the region. To address this challenge, our team of U.S.-, Indonesia-, and Malaysia-based scientists are working together to build and support a strong network of researchers and conservation leaders to co-create research, outreach, and capacity-building programs to shape a more just, resilient, and sustainable future for the people and forests of Southeast Asia.

KEYNOTE SPEAKERS

Dr. Muhammad Ali Imron

Toward real-time automation of acoustic detection for human-elephant conflict mitigation in Sumatra, Indonesia

Muhammad Ali Imron[1], Awan Prasetyo[2], Giot Simanullang[1], Rahma Ayu Nabila[1], Dennis Albihad[1], Febrian Edi Nugroho[1], Farah Dini Rachmawati[1], Muhammad Tafrichan[1], Muhammad Hanif[2], Anggun Prasetyo[2], Hero Marhaento[1], Alexander Markus Mossbrucker[3], Karl Radtke[3]

1 Faculty of Forestry, Universitas Gadjah Mada, 2 Karomap, 3 International Elephant Project

Abstract

Mitigating human-elephant conflict crucially depends on detecting elephants. Currently, this task usually involves using GPS collars; however, this method poses challenges in terms of efficiency and safety for both elephants and humans. Our current work explores the potential use of the passive acoustic monitoring and combined with information technologies as basis for real-time monitoring of elephant presence, complementing existing GPS collar monitoring. We collected vocalizations from captive elephants at Gembira Loka zoo, from semi captive elephants in Tangkahan of North Sumatra Province and Way Kambas National Park, and from wild elephants in Bukit Tigapuluh Landscape in Jambi. The collected sounds data from 2021 to 2022 were annotated and used to develop machine learning for vocalization detection. Datuk Gedang, A Web GIS combined with android apps were developed to help monitoring the geolocation of the presence of elephants. Our approach was able to detect variations of vocalization among different locations and our machine learning could identify the presence of elephant in study site in Bukit Tigapuluh landscape. The approach also has successfully sent real-time data o the presence of the elephant through Datuk Gedang apps and dashboards. We discuss the need for further improvements and research to enhance the application of Datuk Gedang in supporting the mitigation of human-elephant conflict.

SYMPOSIUM 1 (9 November 2023, 10:30-12:15)

The Study of Javan Scops-owl (*Otus angelinae*) Using Passive Acoustic Monitoring in the Mount Merbabu National Park

Asman Adi Purwanto[1] , Yusuf Eko Prasetyo[1], Sungkono[1], Irfan Rosyadi[2], Ign Pramana Yuda[3]
1 BISA INDONESIA, 2 Kanopi Indonesia, 3 Atma Jaya University Yogyakarta
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Abstract
Javan Scops-owl (*Otus angelinae*; JSO) is an endemic nocturnal raptor of Java, Indonesia. It has been listed as "Vulnerable" on the IUCN Red List, mainly due to habitat loss. While its known distribution is restricted to the mountain forest in the western part of Java, it was recently photographed in Mount Merbabu National Park, more than 400 km away from western population. Through passive acoustic monitoring, we aimed to confirm the previous report and to understand JSO ecology and habitat preference in Mount Merbabu National Park. From October 2022–April 2023, we deployed SwiftOne recorders in three forest blocks (Selo, Ngagrong and Argoloka). Within each forest block, we deployed 4 recorder units systematically along an elevational gradient in the sub-montane forest between 1600-2200 m above sea level (asl). We recorded a total of 1035 hours from 69 nights (05 pm–07 am) at these 12 sites. We manually reviewed all recordings in Raven Pro 1.6.5 and identified a total 89 JSO calls. JSO was acoustically detected in all three forest blocks: at Selo from 1827–2109 m asl, at Ngagrong from 1751–1912 m asl, and at Argoloka from 1829–1930 m asl. Of the 89 JSO calls, 46 (52%) were recorded between 01.00-05.00 am, 25 (28%) were recorded between 05.00 pm-09.00 pm, and 18 (20%) were recorded between 11.00 pm-01.00 am. These findings confirmed the previous report and have mapped the spatial and temporal distribution of JSO in Mount Merbabu National Park. We are now working on further analysis of the recorded calls, which could support the Management of the National Park.

Assessment of Avian Species Diversity in the Urban Landscape of Malang, Indonesia

Riri Wiyanti Retnaningtyas[1], Millenia Luna Amengka[1], Adityas Arifianto[2], Sandra Rafika Devi[3]
1 BirdPacker Indonesia, 2 Brawijaya University, 3 Universitas Gadjah Mada

Abstract
The response of birds to anthropogenic disturbance remains unclear, particularly in urban areas. Malang is a city in East Java with rapid urban development that is surrounded by nature reserves, primary rainforest, and a nearby national park. However, the diversity of birds in Malang is still understudied. While vocalizations of birds can reflect their phenology, theoretically it also reflects how they adapt to urban life. Therefore, this study aims to assess the species richness in different habitat types in Malang areas and compare the species composition in urban areas of Malang with a bioacoustics approach. In doing so, we use passive acoustic monitoring (PAM) to record bird vocalizations in urban areas of Malang, such as parks, campuses, suburban areas, and rural areas of Malang, with a number of sampling sites ranging from 4 to 5 points in each habitat type. We deployed the recorder for three days in each sampling site using 32 kHz sample rate and 28dB gain. As a reference, direct observations of birds were also conducted in each sampling site. We identified the vocalizations based on existing recordings in Xeno Canto. We used Raven 2.0 to analyze the sound recordings. The assessment of acoustics diversity is currently ongoing. Our findings will contribute to conservation efforts to mitigate the negative impacts of human activities on bird populations in urban areas.

Passive Acoustic Monitoring as A Long-term Monitoring Tool for Kenyir State Park, Malaysia: A Glance Into Spatial and Temporal Patterns of Variation in lar Gibbon Loud Calls

Bryan Nesaraj George
Nature Based Solutions

Abstract
The 30,000 ha of Kenyir State Park (KSP) consists of biodiversity-rich and ecologically sensitive lowland-hill dipterocarp forests. Previous research efforts were intermittent and dispersed across the landscape, with no concerted efforts to establish a baseline for biodiversity that may lead to a long-term monitoring protocol. Therefore, the use of passive acoustic monitoring (PAM) in assessing fauna distribution, behavior, and long-term population trends in KSP provides a practical and cost-effective method to inform decision-making at all phases of the management process, which in turn can improve habitat quality, biodiversity, and community livelihoods. Lar gibbons, an important keystone species found in KSP, are good potential indicators of a healthy forest. Our preliminary study deployed 10 rugged SwiftOne recorders adjacent to a highway that cuts across KSP. Lar gibbon detections were analyzed using BirdNET Analyzer GUI. We used BirdNET transfer learning, a machine learning tool for automated detection, to study the spatial and temporal distribution of the lar gibbons in KSP. Our study is an important precursor to expanding monitoring efforts across the entire 30,000-ha area and incorporating additional indicator species into subsequent analyses.

Advancing Conservation: Unveiling the Vocalization of a Black Hornbill's Family with Passive Acoustic Monitoring

Firman Heru Kurniawan[1,2], Riki Rahmansyah[1], Aryf Rahman[1], Mikael Raparmanto[1], Yokyok Hadiprakarsa[1]
1 Rangkong Indonesia, 2 Natural Resources and Environmental Management Science, IPB University, Bogor, West Java, Indonesia
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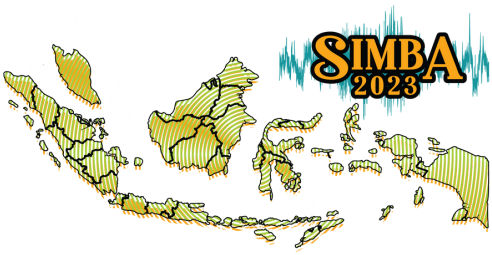
Abstract
Slow research progress can hinder conservation efforts, especially for threatened species like hornbills. These elusive cryptic birds, primarily found in deep forests, pose challenges for study, resulting in limited data availability. To address this, we explored Passive Acoustic Monitoring (PAM), an indirect bioacoustics monitoring, as an alternative for studying Black Hornbill *Anthracoceros malayanus* breeding behavior. Monitoring was conducted in West Kalimantan, Indonesia from December 2022 to January 2023 (37 days). We deployed a SwiftOne recorder ±2 m from the active nest, operated with a duty-scheduled setting (59 recordings per hour) for 24-hour at 16 kHz frequency and a 28 dB gain. We created spectrograms using Raven Pro 2.0 and manually identified sounds of interest. We obtained 886 independent recordings, totalling 52,274 minutes. An adult Black Hornbill's sound frequency ranges between 0.43-3.84 kHz with an average frequency 95% of 3.06±1.49 kHz. The chick's call has a higher frequency range of 2.17-5.49 kHz with an average frequency 95% of 5.06±1.1 kHz. We annotated sounds such as male wingbeats and various vocalizations from males, females, and chicks that could be used to monitor their behavior in future. These data allow inference of incubation duration, hatching events, juvenile stay, male arrival patterns, and fluctuation, as long as the recorder is deployed from the first to the end of the nesting period which has not been covered by this study yet. However, this method provided a complement to the direct observations, reducing observer disturbance and enabling continuous monitoring, which is challenging through direct observations.



ABSTRACTS

Exploring the Bioacoustics of Southeast Asian Anurans: Current Insights and Future Prospects Through Passive Acoustics Monitoring

Dasi Ong, Shahriza Shahrudin
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Abstract
Bioacoustics, the study of sound production, transmission, and reception by living organisms, holds immense potential for understanding anurans (frogs and toads) in Southeast Asia. With a staggering 1088 anuran species (as of 15 September 2023) residing in this biodiverse region, there is an urgent need to address the stark deficit in anuran bioacoustics research. Despite the rich anuran diversity in countries like Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Timor-Leste, Thailand, and Vietnam, less than 30% of their bioacoustics have been explored. This knowledge gap is a critical limitation, as anuran vocalizations are invaluable for assessing ecosystem health, monitoring biodiversity, and comprehending the effects of environmental fluctuations on amphibian populations. These vocalizations not only reveal the presence and well-being of anurans but also provide insights into the existence of cryptic species within their populations. Our current initiative and progress focuses on compiling bioacoustics data for six anuran species in the region. To date, we have described the bioacoustics of six species, with four species already published and two more currently in draft form. Additionally, we have two other species pending analysis, contributing significantly to the understanding of anuran communication in Southeast Asia. The urgency of our work lies in harnessing passive acoustic monitoring (PAM) as a cost-effective and non-invasive method to bridge this knowledge gap. PAM offers the means to collect continuous and precise data on anuran vocalizations, serving as a beacon of hope for comprehensive long-term ecological research and conservation efforts. By utilizing PAM, we can unlock a deeper understanding of these vital amphibian populations and their habitats in Southeast Asia, ultimately contributing to the preservation of this unique and fragile ecosystem.

Creating A Pathway Where People with Diverse Backgrounds and Abilities are Encouraged to Engage with Nature Through Sound

Aini Hasanah Abdul Mutalib, Baizul Hafsham Badli Sham, Muhammad Fatihah Syafiq Rahman, Amirrudin Ahmad
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Abstract
Project SoundsKape is a research project in the Kenyir Landscape, Terengganu, Malaysia, that is based on tracking the auditory symphony of wildlife, using Passive Acoustic Monitoring. Surrounded by a man-made lake, half of the area in Kenyir is protected and functions as a water storage area. In addition to subsistence use by local communities, the forest within this region is also home to the lar gibbon (*Hylobates lar*) and siamang (*Symphalangus syndactylus*). These endangered small apes are known for their characteristic vocalisations. Our study involves scientists working together with local people to integrate traditional ecological knowledge into field work and research design. Therefore, through Project SoundsKape we not only record gibbon songs for research purposes, but concurrently use these to create new opportunities for information sharing with members of the local community to expand the appreciation of wildlife neighbors like anurans, birds, and other taxa in this region through the expanded sensory experiences of sound.

Javan Gibbon (*Hylobates moloch*) Calling Behavior in Two Different Habitat Types in Gunung Halimun Salak National Park, Indonesia

Fauzia Yudanti[1], Rahayu Oktaviani[1], Jasmine Savitri[1], Yoonjung Yi[2], Teguh Angguh[3]
1 Yayasan Konservasi Ekosistem Alam Nusantara, Indonesia,
2 Laboratory of Animal Behavior and Conservation, College of Biology and the Environment, Nanjing Forestry University, Nanjing, China,
3 Gunung Halimun Salak National Park, Indonesia
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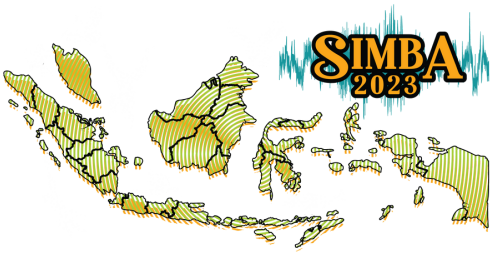
Abstract
All gibbon species are known to produce loud, long, and stereotyped songs. They sing to mark their territory, maintain spacing among groups, and form close bonds within groups. Of nine gibbon species in Indonesia, the Javan gibbon (*Hylobates moloch*) is the only small ape living on Java island. While Javan gibbons mainly inhabit primary forests, they are also found in more destructed and fragmented secondary forests. Investigating their songs using passive acoustic monitoring (PAM) can be the best way to check their presence/absence in those areas, and also learn the difference in their call frequency, duration, and properties between primary and secondary forests. We conducted a survey to detect the presence of Javan gibbons and determine the song attributes they produce in two different area types (an intact forest in the heart of a protected area and a fragmented forest at the boundary area) in Gunung Halimun Salak National Park, Indonesia. We recorded continuously over a 24-hour period on August 2022 and October 2022 using a sampling rate of 48 KHz. We used Raven Pro 1.6 to create spectrograms of sound recordings and 12 observers audio-visually scanned 2,520 recordings and identified 1,366 gibbon songs from both sites. The female great call rates were 0.93 times/day in the primary forests and 0.3 times/day in the fragmented forests. We only found male call in fragmented forests and the rates were 0.1 times/day. We used Rstudio to conduct a principal component analysis on 128 high-quality female great-call climax parts, which resulted in three PCs explaining a cumulated variance of 80.48% of the total variation. PC1 (frequency-related factors) and PC2 (bandwidth) were significantly different between the two study sites. We expect the result of this study could provide insight into the benefit of new technology and further study about the next step of conservation action needed for the Javan gibbons, such as population density estimation and differences in calling behaviours in general.



ABSTRACTS

SYMPOSIUM 2 (10 November 2023, 10:15 - 12:30)

Population and Distribution Mapping of the Only Naturally Hybridized Gibbon in Central Borneo, Indonesia

Jorian Akasha Hendriks
Borneo Nature Foundation

Abstract
Acoustic research is a rapidly growing field with high conservation potential. Namely for primates that produce loud calls such as gibbons (*Hylobates*), make ideal candidates for auditory sampling. Gibbon songs are species-specific, with gibbon vocal repertoires largely genetically determined; especially the great call of the female gibbon which is the most genetically conserved vocal phrase of a gibbon's vocalization. Mated gibbon pairs engage in antiphonal vocal phrases to produce a coordinated duet song. Duetting is the primary way in which mated pairs communicate, locate each other, and signal their territories, while individuality is crucial to identifying conspecifics. Although, songs of many gibbon species are well-developed, knowledge on hybrid gibbon songs are sparse. The remote rainforest of Central Borneo harbors a unique Bornean hybrid gibbon population (*Hylobates albibarbis* x *Hylobates muelleri*), offering a fascinating opportunity to study hybrid songs. The Bornean Hybrid was discovered in 1979 and is one of the least well-studied primates in the world. Fewer than 30 studies have investigated the hybrid population in Central Borneo, with the most insightful study conducted in 1992; nearly 40 years ago. However, the need to vocal characterize the hybrid population is urgent as exploitative (il)legal logging and mining have intensified in Central Borneo, due to the rainforest unprotected status. Therefore, considering the importance of singing behavior in gibbons for survival and reproduction, and the sparse knowledge on the topic of hybrid vocalizations in an area where anthropogenic disturbance is rapidly increasing, there is an urgent need to fill this knowledge gap. Using two auditory methods – bioacoustics and triangulation, this study aims to contribute to establishing a quantitative basis for the identification and comparative analysis of hybrids songs with that of their parents *Hylobates albibarbis* and *Hylobates muelleri* through vocal analysis, while providing density and population estimates and understanding if any relationship exists between density and habitat types.

Sound Patterns of Plaintive Cuckoo (*Cacomantis merulinus*) at the IPB Dramaga Campus, Bogor, Indonesia

Yaumud Raiyardhi, Yeni Aryati Mulyani, Dones Rinaldi
Department of Forest Resources Conservation and Ecotourism, Faculty of Forestry and Environment, IPB University

Abstract
Plaintive cuckoo (*Cacomantis merulinus*) is a species of cuckoo that is more often heard than seen. This study aims to describe variations in sound patterns of the bird in several habitat types in IPB Dramaga Campus. Data were collected from March to May 2023. Sound recording data was taken with a SwiftOne sound recorder using the PAM (Passive Acoustics Monitoring) method. Calibration of the tool used a microphone gain of 28 dB and a sample rate of 32kHz and then analyzed using Raven Pro 1.6. Identification of cuckoo sound was verified using the website xeno-canto.org and ebird.org. The results identified four sound patterns of the Plaintive Cuckoo. One sound pattern, "wik -teuu-we" had never been reported from Indonesia. Variations in sound patterns in different habitat types are influenced by background noise and sound power. Further study is needed to see the role of plaintive cuckoo as one of the environmental indicators in human-dominated habitat.

Echoing Gibbon's Song to Reconnect Public Audiences with Nature

Rahayu Oktaviani[1], Fauzia Yudanti[1], Jasmine Savitri[1], Teguh Angguh[2], Yoonjung Yi[3]
1 Yayasan Konservasi Ekosistem Alam Nusantara (KIARA)
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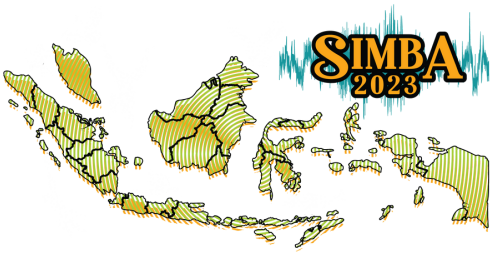
Abstract
Communicating science is one of the ways to engage public audiences and helps create a sense of connection with the unique wildlife diversity in our home country of Indonesia. Effective science communication is engaging, easy to understand, accessible to a broad audience, and should enhance support for or participation in conservation efforts. Here, we will share our stories and show a few examples of how we translate the science for the outreach activity to reconnect people with nature using the audio data we retrieved from the BEAT project of 'Halimun Gibbons' that we gathered between 2022 and 2023 to record the presence of Javan gibbons (*Hylobates moloch*) at two areas in Gunung Halimun Salak National Park, West Java, Indonesia. We use the power of sound to engage with the general public and spread the love for the gibbons by collaborating with (1) Mindfulness practitioners by conducting a mindfulness practice for the general public and listening to the gibbons' song for relaxing and increasing well-being and (2) Local illustrator, to develop an audio storybook about 'Gibbon & The Forest', which is aimed for the children to get closer with the Indonesian nature and wildlife. We expect the knowledge from this activity may increase the public's awareness and appreciation for the treasure of nature's wonder that exists nowhere else on the planet.



ABSTRACTS

Asssessment of Bird Species Richness in Urban Area Using Passive Acoustic Monitoring and Observational Methods

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Abstract
Conventional methods to assess bird communities that use vocal detection might be hindered by noise in urban habitats. Passive acoustic monitoring (PAM) that records wildlife sounds for a period can be used to detect bird communities. This study compares bird species richness in urban areas using PAM and observational methods. The study took place in four geographical regions in Indonesia: Banda Aceh (Sumatra), Bogor (West Java), Yogyakarta (Central part of Java), and Malang (East Java), with the number of sampling points ranging from 4 to 5. One PAM device was set up non-simultaneously at each sampling point. We used three-day continuous recording, using a sample rate of 32 kHz , and 28dB gain. Bird surveys were also conducted at each sampling site. Identification of bird vocalization recorded by PAM was done using help from the Xeno Canto. The results showed that bird species richness varied among geographical regions. The number of bird species identified by PAM in Bogor did not differ significantly from those identified by the survey method, although there was a slight difference in species composition. Aerial insectivores are more likely to be detected by visual observation while nocturnal and more cryptic species are more likely to be detected by the PAM method. However, Malang showed a different result, where PAM detected a significantly higher number of birds than the observation method. We suggest that the difference in the number of bird species obtained by the two methods is affected by the habitat types.

An Acoustic Survey of Penang Hill Biosphere Reserve Using Passive Acoustic Monitoring

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Abstract
Acoustic surveys are efficiently used to collect data in temperate regions; however, little is still known about its effectiveness in accurately mapping biodiversity in the tropics. Passive Acoustic Monitoring (PAM) is a method where sound recorders are configured and placed to survey an area. PAM is important as wildlife are often heard before seen in the dense tropical rainforest. This study takes place in the Penang Hill Biosphere Reserve, Malaysia where three forest reserve sites and three orchards from various elevations were selected to assess their soundscape and faunal diversity. Two recorders were deployed in each site with a recording schedule of 10 minutes every 30 minutes for 24 hours a day, then left to record for 14 days each month for two months. Soundscape analyses were done by computing five types of acoustic indices and manually annotating soundscapes: biophony, anthrophony and geophony done in subsets of 1 minute every hour in a day from 6 randomly selected days of sound files. Initial results showed there are differences in five of the acoustic indices between the two habitat types and among sites. Annotations of each site portray the variance in the acoustic indices generated. Other than providing insights for planning and execution of conservation measures in the biosphere reserve, the findings will guide the soundscape mapping of other areas of Peninsular Malaysia. Utilizing machine learning for automated detections of the presence and absence of biophony will be used in future assessments to expedite the process and these annotations of this study can be used as a baseline.

Investigating The Effect of Human Disturbance on Endangered Mammals at the Biodiversity Research and Monitoring Station of Sikundur, Gunung Leuser National Park, Sumatra

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Abstract
This bioacoustic research project investigated the impact of human disturbance on endangered mammals at the Biodiversity Research and Monitoring Station of Sikundur, Gunung Leuser National Park, Sumatra. Specifically, the study focused on white-handed gibbons (*Hylobates lar*) and siamangs (*Symphalangus syndactylus*) to explore how chainsaw disturbances affect Hylobatid's calling rate and behaviour in a habitat surrounded by human activity. We continuously monitored six strategically selected locations within the research site for three months each, with recorders placed at 500-meter intervals collecting over 13,200 hours of audio data. We adapted the BirdNET algorithm to automatically identify the sounds of gibbons, siamangs, and chainsaws by employing a feature embeddings approach. The model was trained utilizing over 750 call samples for each Hylobatid species and 375 chainsaw sounds. Temporal alignment facilitated a detailed examination of the potential effects of chainsaw noise on primate vocalizations. Additionally, we collected daily environmental variables such as rainfall and temperature, which were subsequently integrated into our analysis to account for variance unrelated to human disturbance. Quantitative analysis included the calculation of calling rate, call duration, and inter-call intervals during periods with, without and after chainsaw noise occurred as well as the proximity of the chainsaw noise (measured by amplitude). Statistical tests, including t-tests and ANOVA, were applied to determine the statistical significance of observed differences. Our findings illustrate how bioacoustics, as an innovative technique, can complement traditional research methods by not only revealing a diverse range of vocal mammal species, but also providing a crucial insight into the impact of human disturbance can have on primate communication and behaviour, never previously available.

Transforming the Potential of Ecoacoustics Through Knowledge Co-production

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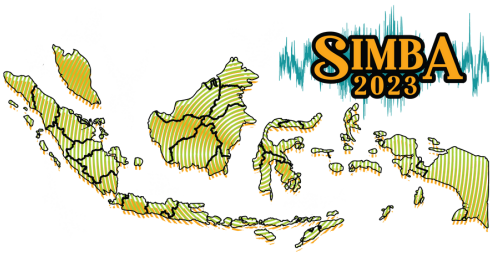
Abstract

Ecoacoustics is a rapidly evolving toolbox for monitoring ecosystems at scale. However, the ecological datasets captured in ecoacoustic studies are not yet widely applicable to evaluating progress towards global biodiversity targets and making local management and conservation decisions. To fulfil the potential of ecoacoustics in serving the aims of non-scientific stakeholders it is crucial that these tools and methods are designed with the end users so that they are practical and accessible to all that use them. To address this, we draw upon the outcomes of a multi-day bioacoustics training workshop held in Central Kalimantan, in which a group of seven students and one researcher from local universities, five research assistants from a local ENGO, two community members and one researcher at a geographical mapping company participated. Participants were trained in the fundamentals of sound, survey design and audio processing. The workshop culminated in the group co-producing a research vision for conducting long-term bioacoustics projects in the region. Text and survey data was gathered from transcripts of the group discussions and written feedback from the participants from the workshop. From this material, we identified four main areas in the ecoacoustics workflow that hinder the transformation of large acoustic datasets into practical results for decision makers. These are i) availability of an adequate sound reference library, ii) computational skills needed for data processing and analysis, iii) access to and practicalities of equipment, iv) data management. We discuss how designing ecoacoustics projects with knowledge co-production practices can mitigate these barriers. Finally, we discuss the further implications of these findings for building co-produced ecoacoustics projects up to be successful conservation tools.



Investigating the Effectiveness of Ecoacoustics as A Conservation Tool in Island Tropical Ecosystems in Penang, Malaysia

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Abstract
Ecoacoustics is a new field investigating the ecological role of soundscapes and the ability to estimate biodiversity and ecosystem health using passive acoustic monitoring (PAM) methods. Present studies show that soundscape indices correlate with species diversity, which may be seen in vocal activity differences throughout the day. However, this is rarely tested in tropical rainforests in Southeast Asia where the vegetation and species assemblage may differ from present studies. Tropical regions are also the most specious and experiencing the most change in landscape and climate. Island rainforests are especially vulnerable to species loss from landscape conversion. Thus, we aimed to examine the effectiveness of using ecoacoustics indices to inform conservation decisions by identifying temporal changes in soundscape indices and how it correlates with bird diversity and anthropogenic activity. We deployed 11 PAM devices across different landscapes in Penang Island, including highland rainforest, lowland rainforest, and botanical garden. We recorded sounds for 1 minute every 10 minutes for two weeks of every month from August 2022 to July 2023. Our preliminary results showed temporal changes in the acoustic indices measured. Soundscape indices varied hourly and monthly, and across sites. A better understanding of the interpretation of soundscape indices in a tropical environment is needed to evaluate its effectiveness for rapid assessment of biodiversity in tropical rainforests.

Lesson Learnt from A Bioacoustic Training for Indonesian Students

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Abstract
Bioacoustics, the study of animal sounds, is a powerful tool that has been promoting new opportunities for understanding multiple organisms that rely on acoustic communication. In Indonesia, bioacoustics technology is considered new and rarely employed by local researchers, despite its potential for supporting conservation efforts for numerous taxa. Bioacoustics is becoming increasingly popular among Indonesian students, however there is a lack of training programs to improve their knowledge and skills. Through the "Halimun Gibbon BEAT Project", we organized training opportunities for Indonesian students. The purpose of the training is to introduce the students to bioacoustics and its application in the field, understand sound analysis tools (Raven Pro software), and individually perform bioacoustics data analysis. We advertised a one-day bioacoustics training through social media (i.e. Facebook, Twitter, and Instagram), and we received 29 applications from undergraduate and graduate students. In order to make the training more effective, we selected ten successful participants. The training was held on March 1, 2023, at the Faculty of Forestry, IPB University, Bogor, Indonesia. Subsequently, the participants could analyse the data we shared remotely for a month and followed by an evaluation. With this case study, although it was constrained by time, we believe the participants developed the skills and confidence to apply bioacoustics in their future works. We expected the participants also can spread the information and knowledge they gained with their respective communities or organizations.

Symposium For Indonesia-Malaysia BioAcoustics