




Conservation news

Promoting conservation of fireflies in Kuala Lumpur's urban park through experiential learning

Kuala Lumpur is a megacity beaming in streetlights, but few are aware of nature's light show—the fireflies. Bukit Kiara, an urban park in the heart of Kuala Lumpur, is home to eight species of fireflies. Among them is an unidentified species of the enigmatic genus *Lamprigera*, of which the females are large and wingless but the winged males have a crepuscular courtship period. The larvae are noteworthy for their green glow. However, with highway and housing developments bordering Bukit Kiara, fireflies in the area are potentially at risk from the increasing impact of human activities.

During March–May 2023, six students of Monash University Malaysia's School of Science, in collaboration with Friends of Bukit Kiara—a non-profit organization working on long-term conservation of the park—conducted undergraduate research projects on the fireflies of Bukit Kiara. The projects received support from the Department of National Landscape, the park administrator of the area. The goal of the projects was to understand how firefly distribution and abundance can change in response to biotic and abiotic factors, such as the effects of artificial light at night, microhabitat types and plant species composition. We also designed a study to verify the accuracy of the firefly larval measurement data that volunteers have collected through the Friends of Bukit Kiara's citizen science flagship programme, Magical Mysteries at Bukit Kiara.

After the 3 months of experiential learning, students who had never worked in limited light conditions or handled nocturnal insects could identify firefly species from their flashing patterns. After all projects concluded in late May, we co-organized a guided firefly walk for the public to celebrate World Firefly Day on 1 July 2023. About 60 participants aged 5 years and above took part, guided by 20 Citizen Science Ambassadors, which included Monash University Malaysia students who received training to conduct the firefly survey. Following the walk, we hosted a public webinar on 5 July featuring three talks, including one student project on the impact of light pollution on fireflies. We plan to continue this experiential learning with future students and volunteers and to collaborate with other organizations to improve firefly conservation in Malaysia.

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Highlighting the importance of IUCN Species Survival Commission Specialist Groups at the International Mammalogical Congress

The International Mammalogical Congress, held every 4 years, took place during 14–20 July 2023 in Anchorage, Alaska, USA, as a joint meeting with the American Society of Mammalogists (ASM). This event was a valuable opportunity for the IUCN Species Survival Commission Small Mammal Specialist Group (small-mammals.org) to share knowledge, expand membership and raise the profile of small mammal research, with four of the group's leaders hosting workshops and a symposium, and presenting several papers. These workshops—Assessing the Taxonomic and Geographic Shortfalls in IUCN Red List Assessments: Guidelines for ASM Researchers (TL, RK and NU), and Mammal Species of the World Next: Workshop for Extended Taxonomic Data Curation (NU and colleagues)—were well-attended and generated new interest in membership of the Small Mammal Specialist Group. Author ST also co-hosted a symposium with Small Mammal Specialist Group member Alexis Mychajliw that focused on the special issues associated with the extinction risk and assessments of island species, including small mammals, in *The Death and Life of Island Mammals: Extinction, Change and Resilience From Past to Future*. Individually, we presented eight research talks, covering a range of topics related to small mammals, such as Shade Cocoa Agroforests as Refuge Zones for Mammals (TL), Saving Island Mammal Biodiversity: Looking to the Future (RK), Holocene–Modern Mammal Extinctions in Hainan, China (ST), and Mammal Taxonomy Over the Ages: Analysis of Species Distributions and Updating the Mammal Diversity Database (NU).

The Mammal Diversity Database (mammaldiversity.org) has been adopted as the Small Mammal Specialist Group's official taxonomic reference, to ensure consistent taxonomy when carrying out small mammal Red List assessments. The significance of the decision to use the Mammal Diversity Database was recognized at the Congress, but the Small Mammal Specialist Group also stressed the need for new data (e.g. on distributions) as key for updating assessments. The Congress provided an opportunity to recruit Red List assessors who are experts on certain taxa and to emphasize the relevance of

Specialist Groups to researchers in fields such as taxonomy, systematics and biogeography.

The Small Mammal Specialist Group is exploring a re-organization of its structure, to be more efficient and comprehensive in future reassessments, and we spoke to mammalogists at the Congress who can assist in improving our goals. We view participation of Specialist Groups at international conferences as critical and it is important to present our mission and activities to the researchers who work closely with small mammals. It is through them that we will gather the necessary data to enhance the quality of Red List assessments, develop plans and implement viable conservation actions, addressing the Assess–Plan–Action priorities of the Species Survival Commission.

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Revolutionizing tropical peatland restoration in Indonesia: the 4N approach

The Center for Standardization of Disaster Resilience and Climate Change Instruments, Indonesia Ministry of Environment and Forestry, and the Mushroom Initiative collaborated from early 2020 to September 2023 to reforest degraded Indonesian peatlands using the 4N rehabilitation concept. The 4N approach stands for: No plastic (replacing plastic polythene bags with biodegradable pots made from *purun* grass and bamboo during planting), No burning (employing local community land preparation instead of burning), No chemical fertilizer (using mycorrhizal fungi instead of chemical fertilizers), and promoting Native peatland tree species over non-peatland trees. Through the 4N concept we can simultaneously restore peatland ecosystems and reduce and avoid greenhouse gas emissions to help mitigate climate change. Fire is a major threat to peatlands, and intensive maintenance is one of the main components of successful peatland reforestation.










The project involved eight researchers with expertise in microbiology, silviculture, genetics, carbon valuation, forest community empowerment and policy, and more than 10 stakeholders. We collaborated to rehabilitate c. 116 ha of tropical peatlands in Pdamaran, South Sumatra (51 ha) and Tumbang Nusa, Central Kalimantan (65 ha). More than 190,000 seedlings of 50 native peatland species were



The making of *purun* pots for raising seedlings as an alternative to polythene bags, and 3-year old planting of the native peatland species *Shorea balangeran*. Photos: Wahyu Catur Adinugroho.

planted and inoculated with 15 mycorrhiza species. Planting took place each year, starting in 2020 and concluding in March 2023. A final evaluation in early September 2023 showed that seedling survival exceeded 70%.

The 4N approach has several benefits. Replacing plastic polythene bags, which have a carbon footprint of 6 kg CO₂ per 1 kg of plastics (timeforchange.org/plastic-bags-and-plastic-bottles-co2-emissions-during-their-lifetime), eliminates 54 kg CO₂/ha of emissions. Avoiding fire use through manual land preparation can potentially prevent a total of 290 t CO₂/ha of emissions from burned peat soils (Agus, 2008, *International Symposium on Land Use after the Tsunami*, 5, 103–109) and shrubs (Volkova et al., 2021, *Fire*, 4, 64). The use of mycorrhizal fungi is estimated to avoid the use of up to 187 kg/ha of fertilizer, thereby reducing emissions from chemical fertilizers by 82 kg CO₂/ha (2006 IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Institute for Global Environmental Strategies, Japan). In addition to their adaptability to local sites, selecting native tree species also reduces the carbon footprint associated with transporting seedlings. Planting native species in waterlogged tropical peatlands reduces carbon emissions from peat oxidation but can necessitate up to three plantings because of the challenging conditions. The 4N approach is a departure from outdated revegetation practices, offering sustainability, community involvement, and a reduced carbon footprint, thus contributing to a sustainable future.

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