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A RAPID ASSESSMENT ON VERTEBRATES IN UiTM KUALA PILAH CAMPUS AND ITS ADJACENT FOREST RESERVE, NEGERI SEMBILAN

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Abstract

During the Forest Biological Diversity Scientific Expedition Programme, a rapid assessment was carried out at the Universiti Teknologi MARA (UiTM) Kuala Pilah Campus in Negeri Sembilan, which is built next to the Pelangai Forest Reserve (PFR). The rapid assessment was executed based on direct observation, animal calling, footprints and mark, and active search around the campus and its adjacent forest. In total, 45 species of vertebrates were recorded based on the two days survey, which includes five species of mammals, 32 species of birds, and eight species of herpetofauna. Out of 45 species, only White-handed Gibbon (*Hylobates lar*) and Javan Myna (*Acridotheres javanicus)* are categorised as threatened species under IUCN Red List of Threatened Species. In conclusion, this information presented herein should not be treated as exhaustive and more systematic surveys should be carried out to assist the university and forestry department in terms of vertebrates' documentation within their management landscapes.

Keywords: herpetofauna, mammals, Pelangai Forest Reserve, UiTM, vertebrates

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Introduction

Malaysia is a tropical country and a part of the Sundaland biogeographical region. Malaysia has an area of approximately 33.27 million hectares and is made up of Peninsular Malaysia, the states of Sabah and Sarawak in the eastern region and the Federal Territory of Labuan in the north-western coastal area of Borneo Island. Malaysia is utterly in the equatorial zone, with a hot humid climate rich with tropical fauna and flora. As the outcome, Malaysia is recognized as one of the 12 megadiverse countries in the world, and it is designated as one of biodiversity hotspots in Southeast Asia's tropical region (Ministry of Energy and Nature Resource, 2019; William-Dee et al., 2019).

Malaysia is blessed with a vast array of ecosystems. Malaysia's tropical rainforest serves as the foundation of its biodiversity. Its forest is a unique natural heritage that evolved over 130 million years, resulting in a diverse flora and fauna (Ministry of Energy and Nature Resource, 2019). Malaysia has an abundance of fauna, with 307 species of mammals, including at least 30 species that are endemic to Malaysia, the majority of which are found in lowland habitats. In term of bird diversity, 785 species of birds have been documented, and herpetofauna records shows 242 species of amphibians, and 567 species of reptiles that are unequally distributed across Peninsular Malaysia, Sabah, and Sarawak, with new discoveries being added to the growing inventory on a regular basis (Ministry of Natural Resource and Environment, 2016). Fauna can be found in different kinds of habitats including primary and secondary forest reserve, mangrove forest, peat swamp forest, and forest plantations (Robson, 2020; Francis, 2019; Das, 2015).

Universiti Teknologi MARA (UiTM) Kuala Pilah Campus located in Mukim Parit Tinggi about eight kilometres from Kuala Pilah town, Negeri Sembilan. UiTM Kuala Pilah Campus is located within the vicinity of UiTM Forest Reserve, which is about 405.41 ha, and next to it is the Pelangai Forest Reserve (PFR). Preliminary fauna surveys have been carried out at the UiTM - Kuala Pilah Campus. Two species of fruit bats namely *Cynopterus brachyotis* (Lesser Dog-faced Fruit Bat) and *Macroglossus minimus* (Dagger-toothed Long-nosed Fruit Bat) were recorded by Nokin and Ramli (2022) meanwhile Abu Bakar and Faudzi (2019) have recorded an insect bat *Scotophilus kuhlii* (Lesser Asiatic Yellow House Bat). Furthermore, Gazali et al., 2022 has recorded *Tupaia glis* (Common Treeshrew) in his study at UiTM-Kuala Pilah Campus. During the Movement Control Order (MCO) due to COVID-19 outbreak, there was news about *Panthera pardus* (Leopard) roaming around the UiTM Kuala Pilah Campus. (Assan, 2020). Studies have also been undertaken in the Negeri Sembilan forest reserve, including Angsi FR, Berembun FR, and Kenaboi FR. These are some of the most popular forest reserves for researchers and hikers. According to the studies, Angsi FR has documented nearly 106 species of birds (Shahrul Anuar et al., 2010; Faradiana et al., 2022), 36 species of mammals (Christine et al., 2013; Shahrul Anuar, 2010; Faradiana et al., 2022) and 19 species of herpetofauna (Faradiana et al., 2022), while Berembun FR has listed 37 species of birds, 25 species of mammals, and seven species of herpetofauna (Faradiana et al., 2022). In additional, 125 species of birds (Shahrul Anuar, 2010) and 40 species of mammals (Ramli and Hashim, 2009) were documented in Kenaboi FR.

However, the information on vertebrate diversity in UiTM Kuala Pilah Campus and PFR is still scarce and lacking for any conservation purpose in future. Therefore, the objective of this study is to provide and update the diversity of the vertebrates' in UiTM - Kuala Pilah Campus and its adjacent forest reserve, PFR.

Methods

Study site

A rapid assessment was conducted at Pelangai Forest Reserve during the Forest Biological Diversity Scientific Expedition Programme at UiTM Negeri Sembilan in Kuala Pilah. UiTM Negeri Sembilan is situated adjacent to the Pelangai Forest Reserve, where the forest covers an area of approximately 6535.18 hectares (figure 1). Seven trails were established during the expedition by the organisers. During the expedition, we managed to do the rapid assessment at all established trails and the surrounding area of the UiTM Kuala Pilah Campus.

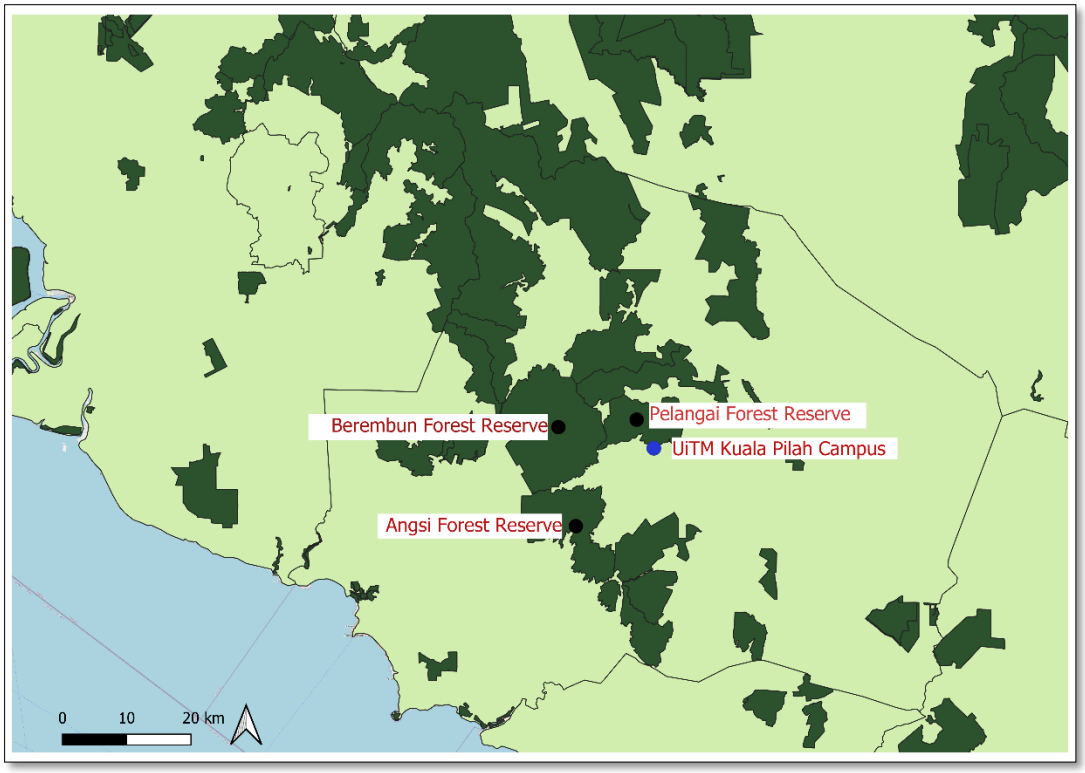

Figure 1. The UiTM Kuala Pilah Campus located adjacent to Pelangai Forest Reserve. Berembun and Angsi Forest Reserve are a few forest reserves located nearby to the Pelangai FR and the campus.

Direct Observation Survey

The direct observation was employed during the expedition to gather data on the presence of vertebrates in the UiTM Kuala Pilah Campus. The observations were conducted for two days during the day and nighttime. Day observation was done from 0700 to 1200 hours and continued from 1630 to 1900 hours to observe diurnal vertebrates. At night, active search and night watch were done from 2100 to 2300 hours to observe nocturnal vertebrates. Five observers conducted the observations, utilising DSLR cameras and binoculars. Binoculars assisted in sighting the vertebrates, while DSLR cameras and reference books (Robson, 2020; Francis, 2019; Das, 2015) were used for the identification of each observed species.

Animal Calling Method

Aside from the observation, calls from the vertebrates were used to identify species presence. Calling of mammal and amphibians were identified by the expert during the observation. For birds, BirdNET (Kahl et al., 2021) application was used to identify the calls made by the birds. All the calls heard were recorded using observer`s smartphone. The calls then were analysed by the application which use machine learning technology to detect and classify the call with the most probable species based on the location and sound.

Result and Discussion

A total of 45 vertebrate species comprising mammals, birds, amphibians, and reptiles were documented during the rapid assessment. Of 45 vertebrates, 14% were classified as Near Threatened (NT), 2% classified as Vulnerable (VU) as well as Endangered (EN) and the remaining were classified as Least Concern (LC) under IUCN List of Threatened Species.

For mammals, five species from four different families were recorded (Table 1), which comprised of families Cervidae, Hylobatidae, Sciuridae and Suidae. Family Sciuridae comprised of two species squirrels: *Ratufa bicolor* and *Callosciurus caniceps* and the remaining family consists of one species. Sighting on both squirrels was observed on a fruiting Ficus tree, which located in campus bordering to

the PFR. While heading to trail 3 from trail 2, we identified *Muntiacus muntjak* and *Hylobates lar* by their barking calls and high-pitched rising vocal 'hoo'. Additionally, we sighted footprints of *Sus scrofa* along trail 4 in PFR.

A total of 32 species of birds from 23 families were documented (Table 2). Among families that were identified were including Accipitridae, Aegithinidae, Alcedinidae, Anatidae, Caprimulgidae, Charadriidae, Chloropseidae, Columbidae, Cuculidae, Estrildidae, Megalaimidae, Meropidae, Motacillidae, Muscicapidae, Nectariniidae, Oriolidae, Passeridae, Picidae, Pycnonotidae, Ralidae, Sturnidae, Timaliidae, and Vangidae. Species under family Columbidae was recorded with the highest percentage of 18.7% which include Thick-billed Green Pigeon, Spotted Dove, Imperial Green Pigeon, Pink-necked Green Pigeon, and Zebra Dove. While the second highest family with most species (9.4%) was family Muscicapidae, which comprised of White-rumped Sharma, Asian Brown Flycatcher, and Oriental Magpie Robin. The third highest family were Nectariniidae, Pycnonotidae and Sturnidae with two species respectively. There are Little Spiderhunter and Olive-backed Sunbird under family Nectariniidae, while Yellow-vented Bulbul and Buff-vented Bulbul of family Pycnonotidae; and Asian Glossy Starling and Javan Myna under family Sturnidae.

Most of the observed bird species can be categorised in various feeding guilds including frugivore, carnivore, granivore, insectivore, nectarivore, and omnivore. Based on the observed species, almost 35% of total species were classified as insectivore followed by omnivore at 25%. The frugivore constitutes of 22% while nectarivore species only comprised of 6.3% of total species recorded. We noticed the Golden-whiskered Barbet and Pin-striped Tit-babbler in the forest core while trekking along the trails, using the BirdNet application to identify the sounds they make. The result in BirdNET application indicated that the identification threshold ranged between “likely” to “highly likely” which are acceptable result. Other bird species were sighted near campus ponds/lakes and fruiting trees since their food sources were available around the campus.

While for herpetofauna, a total of eight species from seven families were recorded (Table 3). The families were Dicroglossidae, Gekkonidae, Microhylidae, Ranidae, Rhacophoridae, Scincidae, and Varanidae. Dicroglossidae comprised two species; *Occidozyga sumatrana* and *Fejervarya limnocharis*, whereas the remaining families recorded a single species. 62.5% of the total species were documented through calling while the remaining 37.5% by observation. Most amphibians were heard while we did our observation near the campus pond/lakes and along the trails. All the herpetofauna recorded were classified as Least Concern under IUCN Red List of Threatened Species.

Table 1: List of mammal species observed during the expedition in UiTM Kuala Pilah and adjacent forest, Negeri Sembilan. Figures in Appendix

No	Family	Scientific Name	Common Name	IUCN Status	Notes
1	Cervidae	*Muntiacus muntjak*	Barking Deer	LC	Calling
2	Hylobatidae	*Hylobates lar*	White-handed Gibbon	EN	Calling
3	Sciuridae	*Ratufa bicolor*	Black Giant Squirrel	NT	Observation (Figure S1)
4	Sciuridae	*Callosciurus caniceps*	Grey-bellied Squirrel	LC	Observation
5	Suidae	*Sus scrofa*	Wild Boar	LC	Observation Footprint (Figure S13)

*Note: Least Concern (LC), Endangered (EN), Near Threatened (NT)

Table 2: Bird species that were observed during the expedition. Figures in Appendix

No	Family	Scientific Name	Common Name	IUCN Status	Notes
1	Accipitridae	*Haliastur indus*	Brahminy Kite	LC	Observation
2	Aegithinidae	*Aegithina tiphia*	Common Iora	LC	Observation
3	Alcedinidae	*Halcyon smyrnensis*	White-throated Kingfisher	LC	Observation
4	Anatidae	*Dendrocygna javanica*	Lesser Whistling Duck	LC	Observation (Figure S2)
5	Caprimulgidae	*Caprimulgus jotaka*	Grey Nightjar	LC	Observation
6	Charadriidae	*Vanellus indicus*	Red-wattled Lapwing	LC	Observation (Figure S10)
7	Chloropseidae	*Chloropsis cyanopogon*	Lesser Green Leafbird	NT	Observation (Figure S7)
8	Columbidae	*Treron curvirostra*	Thick-billed Green Pigeon	LC	Observation (Figure S9)
9	Columbidae	*Spilopelia chinensis*	Spotted Dove	LC	Observation (Figure S3)
10	Columbidae	*Ducula aenea*	Imperial Green Pigeon	NT	Observation
11	Columbidae	*Treron vernans*	Pink-necked Green-pigeon	LC	Observation
12	Columbidae	*Geopelia striata*	Zebra Dove	LC	Observation
13	Cuculidae	*Phaenicophaeus diardi*	Black-bellied Malkoha	NT	Observation (Figure S5)
14	Estrildidae	*Lonchura punctulata*	Scaly-breasted Munia	LC	Observation
15	Megalaimidae	*Psilopogon chrysopogon*	Golden-whiskered Barbet	LC	Calling
16	Meropidae	*Merops leschenaulti*	Chestnut-headed Bee-eater	LC	Observation
17	Motacillidae	*Anthus hodgsoni*	Olive-backed Pipit	LC	Observation
18	Muscicapidae	*Copsychus malabaricus*	White-rumped Shama	LC	Observation
19	Muscicapidae	*Muscicapa dauurica*	Asian Brown Flycatcher	LC	Observation

20	Muscicapidae	*Copsychus saularis*	Oriental Magpie Robin	LC	Observation
21	Nectariniidae	*Arachnothera longirostra*	Little Spiderhunter	LC	Observation
22	Nectariniidae	*Cinnyris jugularis*	Olive-backed Sunbird	LC	Observation (Figure S6)
23	Oriolidae	*Oriolus chinensis*	Black-naped Oriole	LC	Observation (Figure S8)
24	Passeridae	*Passer montanus*	Eurasian Tree Sparrow	LC	Observation (Figure S11)
25	Picidae	*Chrysophlegma mentale*	Checker-throated Woodpecker	NT	Observation (Figure S12)
26	Pycnonotidae	*Pycnonotus goiavier*	Yellow-vented Bulbul	LC	Observation
27	Pycnonotidae	*Iole crypta*	Buff-vented Bulbul	NT	Observation (Figure S4)
28	Rallidae	*Amaurornis phoenicurus*	White-breasted Waterhen	LC	Observation
29	Sturnidae	*Aplonis panayensis*	Asian Glossy Starling	LC	Observation
30	Sturnidae	*Acridotheres javanicus*	Javan Myna	VU	Observation
31	Timaliidae	*Mixornis gularis*	Pin-striped Tit-babbler	LC	Calling
32	Vangidae	*Tephrodornis virgatus*	Large Woodshrike	LC	Observation

*Note: Vulnerable (VU)

Table 3: Checklist of herpetofauna recorded in UiTM Kuala Pilah and its adjacent forest, Negeri Sembilan. Figures in Appendix

No	Family	Scientific Name	Common Name	IUCN Status	Notes
1	Dicroglossidae	*Occidozyga sumatrana*	Philippine Oriental Frog	LC	Calling (Figure S15)
2	Dicroglossidae	*Fejervarya limnocharis*	Field Frog	LC	Calling
3	Gekkonidae	*Hemidactylus frenatus*	Common House Gecko	LC	Observation
4	Microhylidae	*Microhyla heymonsi*	Dark-sided Chorus Frog	LC	Calling

5	Ranidae	*Hylarana laterimaculata*	Masked Rough-sided Frog	LC	Calling
6	Rhacophoridae	*Polypedates leucomystax*	Four-lined Tree Frog	LC	Calling (Figure S16)
7	Scincidae	*Eutropis multifasciata*	Common Sunskink	LC	Observation
8	Varanidae	*Varanus salvator*	Water Monitor	LC	Observation (Figure S14)

Conclusion

In summary, there are five mammal species from four families, 32 birds of 23 families, and eight herpetofauna species from seven families that were recorded within two days survey. Such finding in a short period of time indicates that the campus and its adjacent forest reserves still serve as a primary habitat for the vertebrates. We believe that with more systematic surveys and longer period of monitoring should be undertaken to produce a holistic documentation on the vertebrate species that could serve as a baseline information to any conservation strategic in future.

Acknowledgement

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Author Contribution

All authors contributed equally to the assessment and manuscript preparation.

Conflict of Interest

Author declares no conflict of interest.

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Appendix

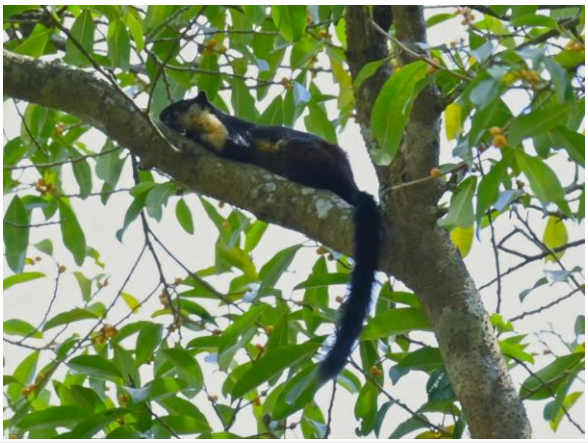

Figure S1. *Ratufa bicolor* (Black Giant Squirrel)

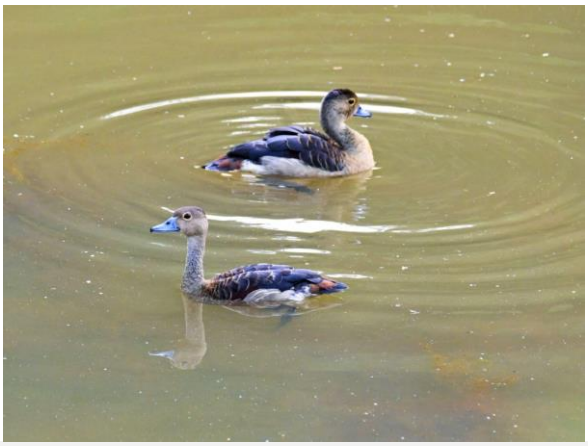

Figure S2. *Dendrocygna javanica* (Lesser Whistling Duck)

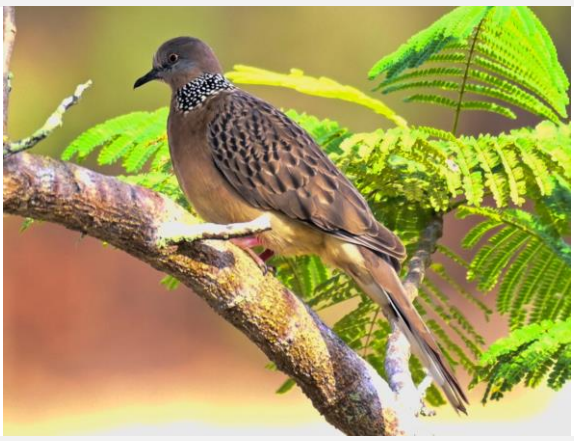

Figure S3. *Spilopelia chinensis* (Spotted Dove)

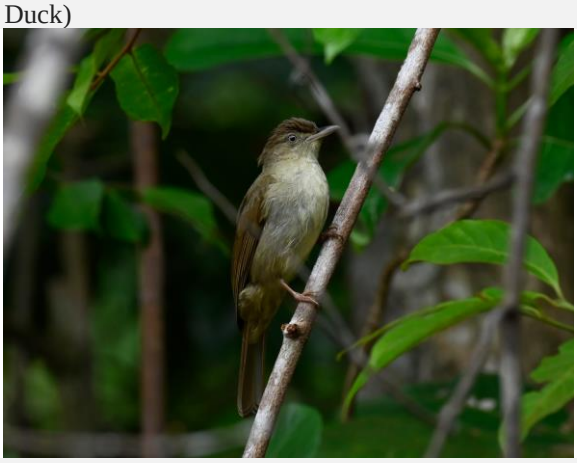

Figure S4. *Iole crypta* (Buff-vented Bulbul)

Figure S5. *Phaenicophaeus diardi* (Black-bellied Malkoha)

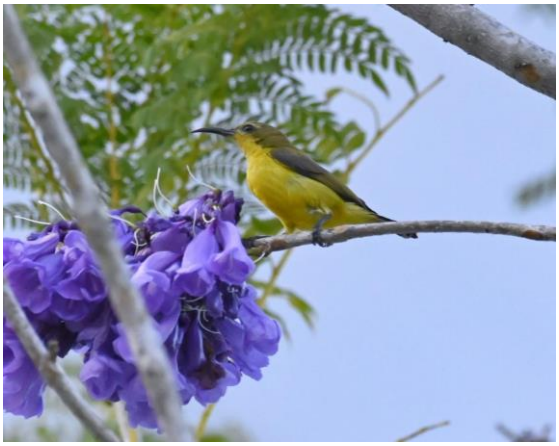

Figure S6. *Cinnyris jugularis* (Olive-backed Sunbird)

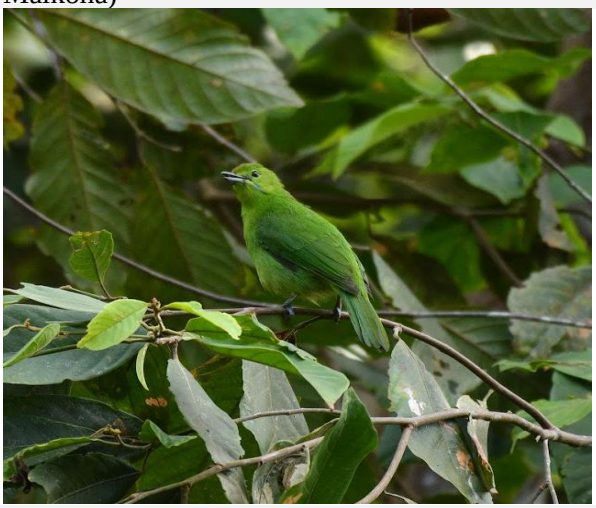

Figure S7. *Chloropsis cyanopogon* (Lesser Green Leafbird)

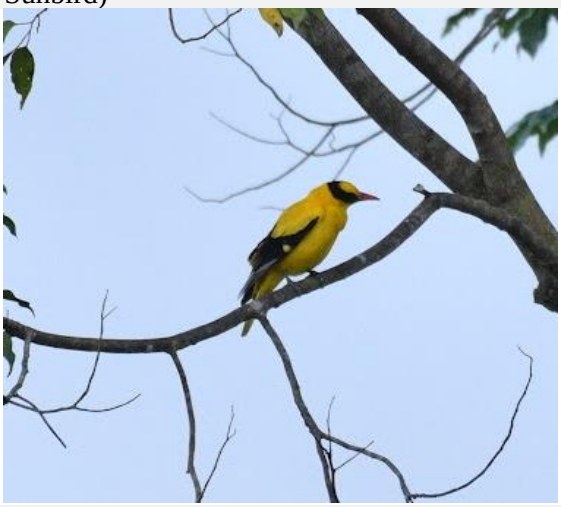

Figure S8. *Oriolus chinensis* (Black-naped Oriole)

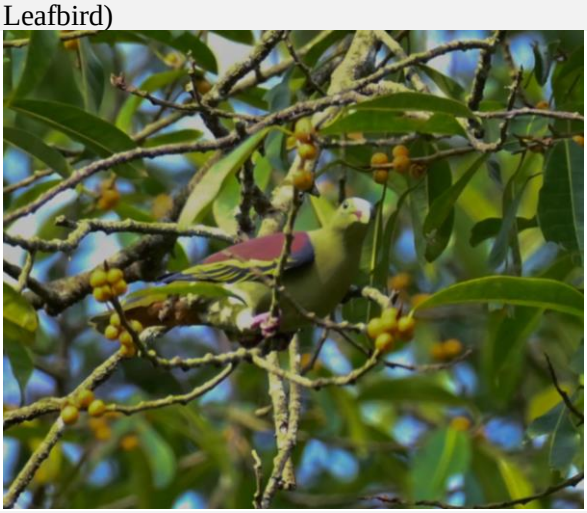

Figure S9. *Treron curvirostra* (Thick-billed Green Pigeon)

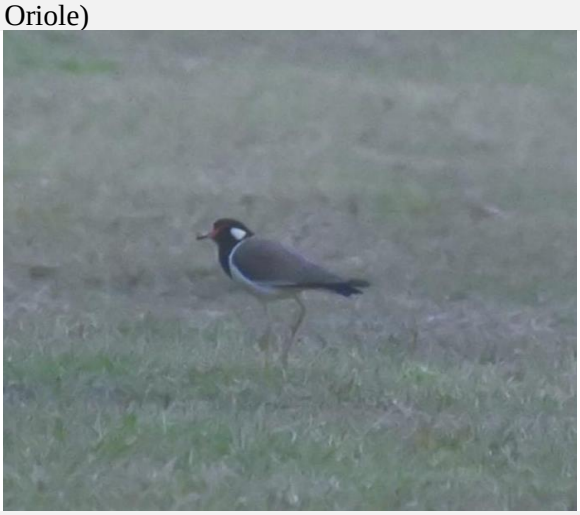

Figure S10. *Vanellus indicus* (Red-wattled Lapwing)

Figure S11. *Passer montanus* (Eurasian Tree Sparrow)

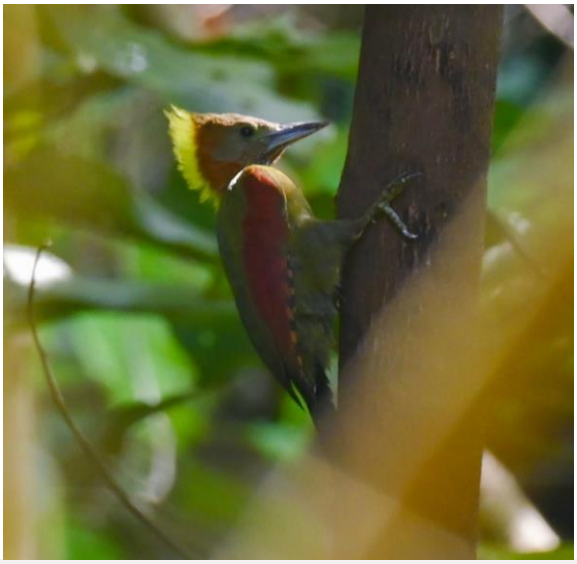

Figure S12. *Chrysophlegma mentale* (Checker-throated Woodpecker)

Figure S13. *Sus scrofa* (Wild Boar) - Footprint

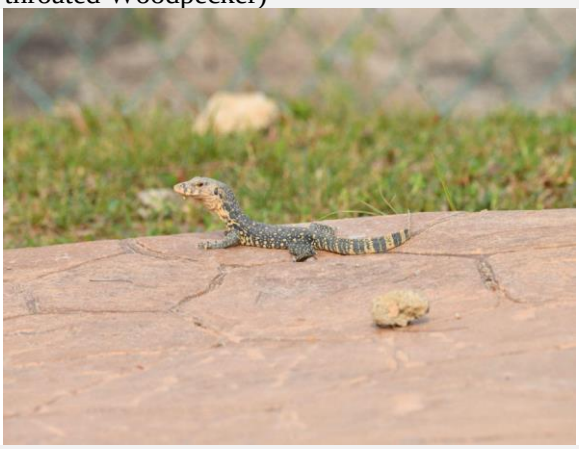

Figure S14. *Varanus salvator* (Water Monitor) – Juvenile

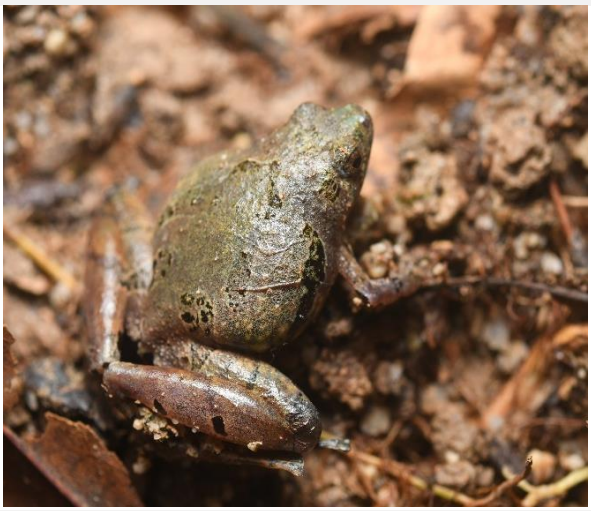

Figure S15. *Occidozyga sumatrana* (Philippine Oriental Frog)

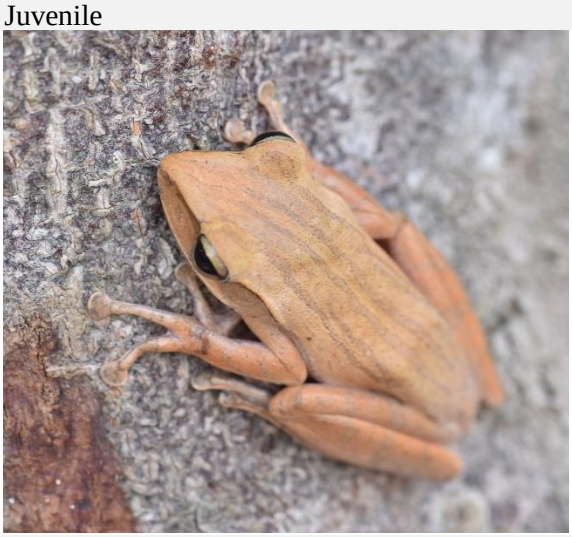

Figure S16. *Polypedates leucomystax* (Four-lined Tree Frog)