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Herpetofauna of Peta Area of Endau-Rompin National Park, Johor, Malaysia

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ABSTRACT

The amphibians and reptiles of Peta, Endau-Rompin, Johor, Malaysia were briefly investigated during a scientific expedition organized by the School of Biological Sciences, Universiti Sains Malaysia from 17 to 23 August 2008. A total number of 47 species of amphibians and reptiles were recorded during the survey. Out of this number, 25 species of amphibians from 15 genera and 6 families were found. Meanwhile, six species of frogs are considered as commensal species and could easily be found in disturbed areas, and the others are forest frogs. A single species of caecilian, namely, *Caudacaecilia nigroflava,* from the family Ichthyophiidae was also recorded. As for the reptiles, 11 species of snakes from three families and 11 species of lizards from four families were recorded to inhabit the area. This report constitutes the first checklist of herpetofauna of Peta, Endau-Rompin, Johor, covering 24.3% of 103 frogs, 14.1% of 78 snakes and 10.2% of 108 lizard species that have been reported in Peninsular Malaysia thus far.

Keywords: Peta, Endau-Rompin, Johor, Peninsular Malaysia, amphibian, reptilian

INTRODUCTION

Endau-Rompin National Park (approximately 49,000 ha) is located in the southern part of Peninsular Malaysia and has been gazetted as a National Park since 1993. This is the second National Park established in Peninsular Malaysia with the main purpose of preserving the natural heritage of the country. The Endau-Rompin National Park area includes the southern part of the state of Pahang and also the northern part of the state of Johor and it is managed by Johor National Park Corporation. Gunung Besar (1036 m a.s.l.) is the highest peak

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and located in the western part of the park. The main river, i.e. Sungai Endau and its tributaries drain the area and empty into the South China Sea near the small town of Endau. This million year old tropical rain forest in Endau-Rompin provides various types of microhabitats that act as sanctuaries for the wildlife which includes amphibians and reptiles.

The park is a home for at least 95 species of mammals, 250 species of birds, and 76 species of fish (Chew, 2007). Several endangered species, such as *Dicerorhinus sumatrensis* (Sumatran Rhinoceros), *Elephas maximus* (Asian Elephant), *Panthera tigris* (Malayan Tiger) and *Tapirus indicus* (Malayan Tapir), were also found here. Other species of mammals, birds and fishes, such as *Sus barbatus* (Bearded pigs), *Felis bengalensis* (Leopard Cat), *Hystrix brachyuran* (Common Porcupine), *Argusianus argus* (Great Argus Pheasant), *Buceros Rhinoceros* (Rhinoceros Hornbill), *Wallago leerii* (Tapah fish), *Tor tambroides* (Kelah fish) and *Scleropages formosus* (Green Arowana fish), were also found to inhabit the forests and the rivers.

Previous studies on herpetofauna in Peninsular Malaysia by several scientists at different locations have shown various numbers of amphibians and reptiles. For example, 54 species of amphibians and reptiles were found in Ulu Endau (Kiew, 1987), 33 species of amphibians and 34 species of reptiles in the western region of Endau-Rompin (Daicus & Hashim, 2004), 24 species of amphibians and 51 species of reptiles in Temenggor (Kiew *et al*., 1995), 19 species of amphibians and 41 species of reptiles in Tasek Bera (Norsham *et al.,* 2000a), 9 species of amphibians and 17 species of reptiles in North Belum forest (Norsham *et al.,* 2000b), 13 species of amphibians in Wang Kelian (Ibrahim *et al*., 2001), 24 species of amphibians and 88 species of reptiles in Seribuat Archipelago (Grismer *et al.*, 2006b), as well as 16 species of amphibians and 23 species of reptiles in Langkawi (Ibrahim *et al*., 2006). Various factors such as duration of sampling period, area of coverage, sampling technique, topography, weather, types of microhabitat and activity pattern have been reported to influence the number of species recorded in each area (Inger, 2003).

Similarly, some continuous studies have also shown increased numbers of the amphibian and reptile species in Peninsular Malaysia. An early record by Berry (1975) showed that there were 83 species of amphibians inhabiting Peninsular Malaysia; however, within 30 years, this number has increased to 100 species (Inger, 2005) and 103 species of amphibians (Norhayati, 2009). The increase in the number of amphibian and reptile species clearly shows that Malaysian forests are very rich in herpetofaunal assemblage. A number of frogs have recently been described; these include *Leptolalax kajangensis* (Grismer *et al.,* 2004b), *Odorrana monjerai* (Matsui & Ibrahim, 2006), *Ansonia endauensis* (Grismer, 2006), *Ansonia latiffi* and *Ansonia jeetsukumarani* (Wood *et al*., 2008), *Gastrophrynoides immaculatus* (Chan *et al*., 2009) and *Leptolalax kecil* (Matsui *et*

al., 2009). As for reptiles, many new species have also been discovered recently from the forests (Leong & Grismer, 2004; Das & Grismer, 2003; Grismer, 2005, 2008a; Grismer & Das, 2006; Grismer *et al*., 2006a, 2008a, b; Grismer & Chan, 2008; Grismer & Norhayati, 2008). Despite the recent discoveries, many areas in Peninsular Malaysia have not been canvassed for their herpetofauna. Therefore, the main objective of this study was to search for and record the amphibian and reptile species that inhabit Peta, Endau-Rompin, as well as to build a baseline data for this particular vertebrate group.

MATERIALS AND METHODS

A herpetological survey of Peta, Endau-Rompin, Johor, Malaysia (Fig.1 and Fig.2) was carried out during a six-day Scientific Expedition, organized by the School of Biological Science, Universiti Sains Malaysia (USM), starting from 17 to 23 August 2008. Kampung Peta, (2^0 54'N, 103^0 41'E, < 300 m a.s.l.) is located in the eastern region of the Endau-Rompin National Park and it is around 52, 106 and 726 km from Kahang, Kluang and USM (Penang), respectively. From Kahang town, it can be reached by four-wheel drive vehicles, which will have to pass through oil palm estates and a primary rain forest before reaching the destination. The lowland dipterocarp forest is dominated by *Dipterocarpus sublamellatus* (Keruing Kerut), *Shorea leprosula* (Meranti Tembaga), *Shorea ovalis* (Meranti Kepong), *Shorea curtisii* (Meranti Seraya), *Neobalanocarpus hemii* (Cengal) *Dryobalanops aromatica* (Kapur), *Koompassia excelsa* (Tualang) and *Alstonia angustiloba* (Pulai). Within the forest, there is a great diversity of other plants species, such as palms, climbers, epiphytes, bamboo, herbs, ferns and fungi.

The collection of amphibians and reptiles was done around the Nature Education Research Centre (NERC) (2^0 53'N, 103^0 41'E), Kuala Jasin (2^0 53'N, 103^0 37'E) and Anak Jasin River (2^0 52'N, 103^0 36'E). All the specimens were collected during day and night (20:00-23:00 hours) along the forest trails, forest floor, swamps, streams, rivers, ponds and puddles. A sampling team comprising of four persons searched and collected the specimens by hand or sweep nets. For the night sampling, torch lights and head lamps were used to locate the specimens. For identification purposes, references such as those by Berry (1975), Denzer and Manthey (1991), Inger and Stuebing (1997), Cox *et al.* (1998), Stuebing and Inger (1999), Frost (2010) and Haas *et al*. (2010) were used. All the captured specimens were fixed with 10% formalin and preserved in 70% ethanol and later deposited at the School of Pharmaceutical Sciences (USM) for future references. The measurements of snout-vent length (SVL) for the frogs and total length (ToL) for the lizards were done using a Vernier caliper, whereas the measurement of the snakes (ToL) was only done by estimation because no specimen was captured, except for *Dendrelaphis pictus.*

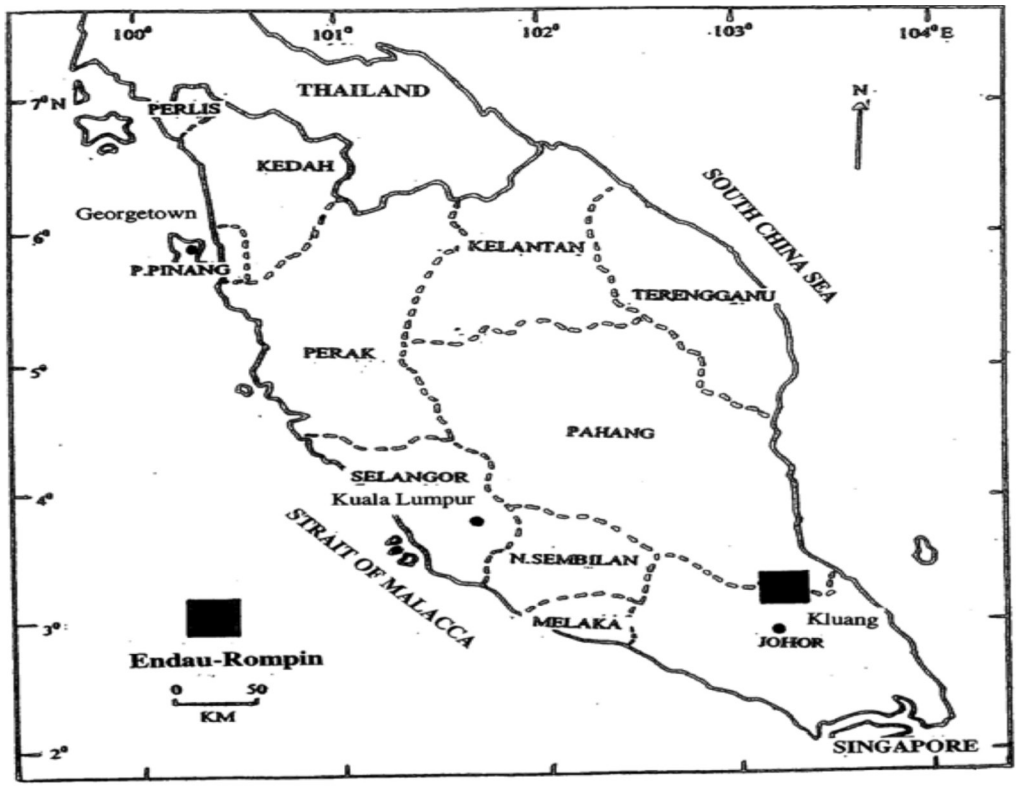

Fig.1: Location of Taman Negara Endau-Rompin

Nature Education Research Centre (NERC)

NERC is located 3 km from Kampung Peta and can be reached by road or river. The research centre is about 1 km X 1 km and is the main centre for the scientists to do their research activities. The facilities provided at the centre include chalets, dorminatories, a multi-purpose hall, a dining hall, an office building, a laboratory, a library and a boat jetty. Around the area, there are artificial ponds, swamps, small streams, bushes and open areas, and it is also surrounded by lowland dipterocarp forest. The sampling activities were done at night and during the day, as stated above.

Kuala Jasin

Kuala Jasin is located some 9 km from NERC and it can be reached by road and river. This is the main recreational area with chalets and camping site facilities for the tourists. In Kuala Jasin, the sampling was done along the Endau River (300 m) and around 3 to 4 m away from the river bank. The sampling was also carried out around the swampy areas, freshwater marsh and along the Janing Barat trail up

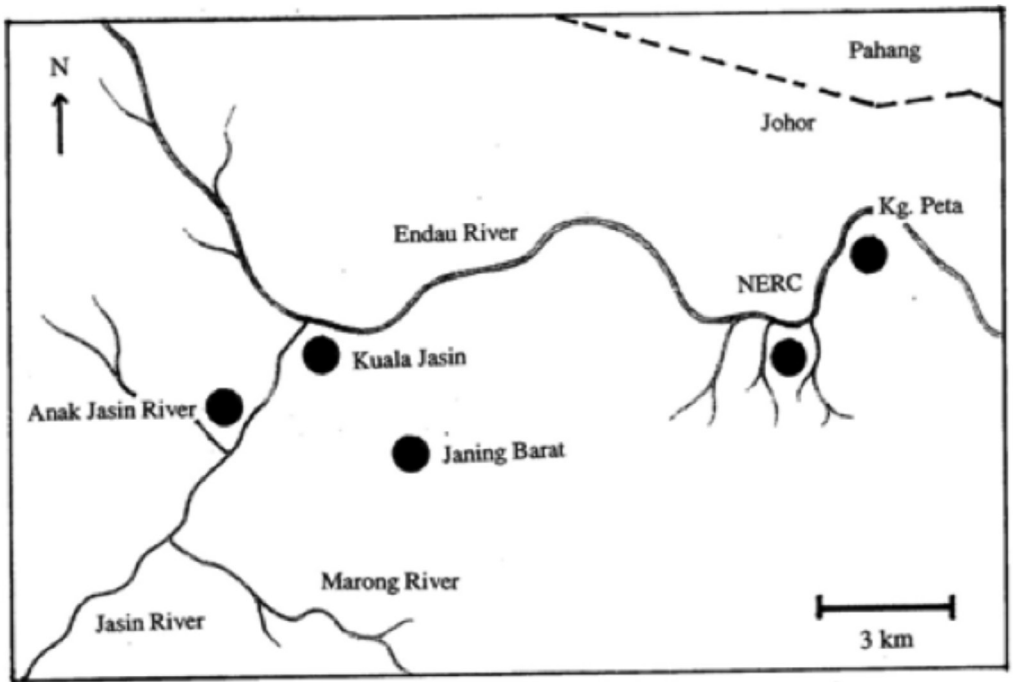

Fig.2: Location of NERC, Kuala Jasin and Anak Jasin River

to the top (450 m a.s.l.). This area is also surrounded by a lowland dipterocarp forest with abundant of palm trees.

Anak Jasin River

Anak Jasin River is about 3 km from Kuala Jasin and can be reached by walking through the Kuala Marong trail. The river flows into Jasin River, Endau River and empties into South China Sea. The sampling was carried out along 300 m of Anak Jasin River and around 3 - 4 m away from the river bank, apart from around the puddles, rain pools and small streams near the river.

RESULTS

Twenty five species of amphibians, 11 species of snakes and 11 species of lizards were found and collected during the six-day expedition. The species and a brief description of their habitat are summarized in Table 1. Meanwhile, the number of the species observed, captured, sex, age, and sizes of the amphibians and reptiles are presented in Table 2.

DISCUSSION

The million year old tropical rain forest in Endau-Rompin provides a variety of environments such as rivers, streams, waterfalls, swamps, freshwater marsh, forest floor and tree canopy that are apparently suitable for the organisms to live in and breed, including the amphibians and reptiles. The six-day expedition revealed 25 species of amphibians and 22 species of

TABLE 1
Amphibians and Reptiles Checklist of Peta and Western Region of Endau-Rompin, Johor

In Peta Area of Endau Rompin (Present Study)		In Western Region of Endau Rompin (Daicus & Hashim, 2004)	
Taxa		**Habitat**	
AMPHIBIA			
Bufonidae			
Ansonia leptopus	-		+
Duttaphrynus melanostictus	-		+
Ingerophrynus parvus	+	Swampy areas, river bank	+
Phrynoidis aspera	+	Perch on the rocks in the river, swampy areas	+
Pedostibes hosii	+	Perch on tree branches near small stream	-
Pelophryne breviceps	-		+
Pelophryne signata	-		+
Dicroglossidae			
Fejervarya cancrivora	-		+
Fejervarya limnocharis	+	On the grass, near pond	+
Limnonectes blythii	+	Swampy areas, river bank	+
Limnonectes kuhlii	+	Perch on the rocks, small rocky stream	-
Limnonectes laticeps	+	Perch on the rocks, small rocky stream	+
Limnonectes malesianus	-		+
Occidozyga laevis	+	Swampy areas, rainpools, puddles	+
Occidozyga lima	+	Swampy areas, rainpools, puddles	-
Ranidae			
Amolops larutensis	+	Rock crevice in cascade area, waterfall	+
Hylarana erythraea	+	Near pond	-
Hylarana glandulosa	+	Swampy areas, river bank	+
Hylarana labialis	+	Perch on tree branches adjacent to the river, on rocks, swampy areas	+
Hylarana laterimaculata	+	Under decaying wood, swampy areas	-
Hylarana picturata	+	Freshwater marshes, small streams in the forest	+
Odorrana hosii	+	Perch on big rocks in fast flowing streams	+
Megophryidae			
Leptobrachium hendricksoni	+	Swampy areas, forest trails, under dead leaves	-
Megophrys nasuta	+	Small streams in the forest	+
Microhylidae			
Chaperina fusca	-		+
Kalophrynus palmatissimus	-		+

Table 1 (*continued*)

Kalophrynus pleurostigma	-		+
Kaloula baleata	-		+
Kaloula pulchra	+	In cement drain	+
Metaphrynella pollicaris	-		+
Microhyla annectens	-		+
Microhyla butleri	+	Tall grass and shrubs	-
Microhyla heymonsi	+	On the road, roadside	+
Microhyla berdmorei	+	Under dead leaves, forest trails	+
Microhyla ornata	-		+
Rhacophoridae			
Polypedates leucomystax	+	Pond and shrubs, in the toilet	+
Polypedates macrotis	+	Perch on tree branches near the road	+
Rhacophorus nigropalmatus	-		+
Rhacophorus pardalis	-		+
Ichthyophiidae			
Caudacaecilia nigroflava	+	Ephemeral pond with a lot of dead leaves	+
REPTILIA			
Snake			
Elapidae			
Bungarus flaviceps	+	Near river bank	+
Naja kaouthia	+	Road kill	-
Colubridae			
Ahaetulla mycterizans	+	On tree branches, dense bush	-
Ahaetulla prasina	-		+
Boiga dendrophila	+	Swampy areas	-
Chrysopelea ornata	+	On tree trunk	
Chrysopelea paradisii	+	On tree branches	-
Dendrelaphis formosus	-		+
Dendrelaphis kopsteini	+	Forest trails	-
Dendrelaphis pictus	+	Edge of the pond	-
Macropisthodon rhodomelas	+	Forest trails	+
Rhabdophis chrysargus	-		+
Pythonidae			
Python reticulatus	-		+

Table 1 (*continued*)

Typhlopidae			
Typhlops diardi	-		+
Viperidae			
Trimeresurus wiroti	+	Near big tree buttress	-
Tropidolaemus wagleri	+	On tree branches along the forest trails	+
Lizard			
Agamidae			
Aphaniotis fusca	-		+
Bronchocela cristatella	+	On tree branches near the road	+
Calotes versicolor	+	Bush and dense shrubs	+
Draco blanfordii	-		+
Draco fimbricatus	-		+
Draco melanopogon	-		+
Draco obscurus	-		+
Draco volans	-		+
Gonocephalus bellii	-		+
Gonocephalus grandis	+	On tree trunk and leaves near fast flowing stream	+
Gonocephalus liogaster	-		+
Gekkonidae			
Cyrtodactylus consobrinus	+	Tree trunk, tree buttress	+
Cyrtodactylus pulchellus	-		+
Cyrtodactylus quadrivirgatus	-		+
Cyrtodactylus sworderi	-		+
Gekko gecko	-		+
Gekko smithii	+	On ceilings, walls and toilets	+
Gekko monarchus	+	On ceilings and walls	+
Gehyra mutilata	+	Dining hall, chalets	-
Hemidactylus frenatus	+	Dorm, dining hall, kitchen, toilets, chalets	-
Scincidae			
Eutropis longicaudata	-		+
Eutropis macularia	-		+
Eutropis multifasciata	+	Cement ditch, forest trails	+
Eutropis rugifera	-		+
Sphenomorphus scotophilus	+	Small stream in forest, dead stump	-
Varanidae			
Varanus nebulosus	-		+
Varanus rudicollis	-		+
Varanus salvator	+	Swampy areas, river banks	+

Table 1 (*continued*)

Freshwater turtle		
Bataguridae		
Heosemys grandis	-	+

Note:
+ Present
- Absent

TABLE 2
Number of observed, captured, sex, age and size of amphibian and reptile specimens of Peta, Endau-Rompin, Johor

Taxa	No. Obs.	No. Cap.	Sex	Age	Size
AMPHIBIA					
Bufonidae					
Ingerophrynus parvus	41	5	3 Male 2 Female	Adult	45-58 mm
Phrynoidis aspera	7	2	Unknown	Adult	134-152 mm
Pedostibes hosii	4	1	1 Male	Adult	92 mm
Dicroglossidae					
Fejervarya limnocharis	9	2	1 Male 1 Female	Adult	54-73 mm
Limnonectes blythii	3	1	Unknown	Adult	115 mm
Limnonectes kuhlii	3	3	Unknown	Adult	49-54 mm
Limnonectes laticeps	5	4	Unknown	Adult	42-48 mm
Occidozyga laevis	8	4	Unknown	Adult	27-34 mm
Occidozyga lima	2	1	Unknown	Adult	25 mm
Ranidae					
Amolops larutensis	25	6	Unknown	4 Adult 2 Juvenile	27-59 mm
Hylarana erythraea	7	2	1 Male 1 Female	Adult	65-92 mm
Hylarana glandulosa	15	1	Unknown	Adult	89 mm
Hylarana labialis	35	4	4 Male	Adult	55-68 mm
Hylarana laterimaculata	2	2	Unknown	Adult	48-57 mm
Hylarana picturata	5	1	Unknown	Adult	54 mm
Odorrana hosii	6	2	Unknown	Adult	108-121 mm
Megophryidae					
Leptobrachium hendricksoni	8	5	Unknown	Adult	42-64 mm
Megophrys nasuta	4	-	-	-	-

Table 2 (*continued*)

Microhylidae					
Kaloula pulchra	5	1	1 Male	Adult	82 mm
Microhyla butleri	8	3	Unknown	Adult	27-35 mm
Microhyla heymonsi	6	4	Unknown	Adult	24-37 mm
Microhyla berdmorei	1	1	Unknown	Adult	47 mm
Rhacophoridae					
Polypedates leucomystax	10	3	2 Male	Adult	55-64 mm
			1 Female	Adult	89 mm
Polypedates macrotis	1	1	Unknown	Adult	108 mm
Ichthyophiidae					
Caudacaecilia nigroflava	1	1	Unknown	Juvenile	184 mm
REPTILIA					
Snake					
Elapidae					
Bungarus flaviceps	1	-	Unknown	Adult	app. 800 mm
Naja kaouthia	1	-	Unknown	Adult	app. 750 mm
Viperidae					
Trimeresurus wiroti	1	-	Unknown	Juvenile	app. 280 mm
Tropidolaemus wagleri	1	-	Unknown	Juvenile	app. 320 mm
Colubridae					
Ahaetulla mycterizans	2	-	Unknown	1 Adult	app. 610 mm
				1 Juvenile	app. 350 mm
Boiga dendrophila	1	-	Unknown	Adult	app. 1520 mm
Chrysopelea ornata	1	-	Unknown	Adult	app. 670 mm
Chrysopelea paradisii	1	-	Unknown	Adult	app. 550 mm
Dendrelaphis kopsteini	1	-	Unknown	Adult	app. 980 mm
Dendrelaphis pictus	2	1	Unknown	Juvenile	app. 540 mm
Macropisthodon rhodomelas	1	-	Unknown	Juvenile	app. 410 mm
Lizard					
Gekkonidae					
Cyrtodactylus consobrinus	2	1	Unknown	Adult	215 mm
Gekko smithii	7	1	Unknown	Adult	296 mm
Gekko monarchus	6	2	Unknown	Adult	184-193 mm
Gehyra mutilata	5	1	Unknown	Adult	132 mm
Hemidactylus frenatus	35	2	Unknown	Adult	114-135 mm

Table 2 (*continued*)

Agamidae					
Bronchocela cristatella	1	-	Unknown	Adult	-
Calotes versicolor	4	1	Unknown	Adult	207 mm
Gonocephalus grandis	3	1	Unknown	Adult	268 mm
Scincidae					
Eutropis multifasciata	5	1	Unknown	Adult	174 mm
Sphenomorphus scotophilus	2	2	Unknown	Adult	133 mm
Varanidae					
Varanus salvator	6	-	Unknown	Adult	-

Note:
No. Obs. = Number observed
No. Cap. = Number captured

reptiles. For the amphibians, the number constituted 24.3% of the 103 amphibian (Norhayati, 2009) species reported in Peninsular Malaysia. As for the snakes and lizards, these covered 14.1% of 78 snake (Norhayati, 2009) and 10.2% of 108 lizard (Grismer, 2008b) species inhabiting Peninsular Malaysia.

Daicus and Hashim (2004) found 32 species of frogs, one species of caecilian, 25 species of lizards, eight species of snakes, and one species of freshwater turtles in the western region of Endau-Rompin. In this study (Peta area), 24 species of frogs, one species of caecilian, 11 species of lizards and 11 species of snakes were recorded. In particular, 15 species of amphibians were found in the western region, but not in the Peta area. Similarly, the seven species found in the Peta area were not found in the western region. Nonetheless, 18 species were found to be common in both places. The seven species of frogs found in the Peta area but not in the western region were *P. hosii, L. kuhlii, O. lima, H. erythraea, H. laterimaculata, L. hendricksoni* and *M. butleri.* As for the reptiles, 23 species recorded in the western region were not discovered in the Peta area. Likewise, 11 species recorded in Peta, were not found in Western Region, and 11 species were recorded in both the places. The 11 species of reptiles inhabiting Peta but not the western region were *N. kaouthia, T. wiroti, A. mycterizans, B. dendrophila, C. ornata, C. paradisii, D. kopsteini, D. pictus, G. mutilata, H. frenatus* and *S. scotophilus*.

The numbers of species recorded in Peta, Endau-Rompin are lower than those reported by Daicus and Hashim (2004) because of several reasons, especially the short duration of the survey period. The six-day exploration is apparently not enough to cover the entire forests, swamps, rivers and waterfalls in Peta. In particular, the present study covered only small areas around NERC, Kuala Jasin and Anak Jasin River. Other unvisited areas around Peta, especially areas deep in the forest, such as Tasik Air Biru, Upeh Guling and Buaya

Sangkut waterfalls, are suggested to be intensively explored so as to discover more species of amphibians and reptiles. For comparison purposes, Daicus and Hashim (2004) conducted a longer survey period (about 20 days) and covered more pristine areas such as Lubok Tapah, Lubok Merekek, Takah Tinggi Waterfall, Sungai Selor and Gunung Tiong.

Most of the frogs captured were of the riparian species due to the fact that the sampling areas were more focused to rivers, streams and swamps. Only two rhacophorids were found, namely *P. leucomystax* and *P. macrotis*, because of their arboreal characteristics. Others were not found as tree frogs, such as *R. nigropalmatus* and *R. pardalis*, live and forage high in the tree canopy and only come down to the forest floor during the breeding season. These two species usually choose wildlife (pig or rhinocerous) wallows in the forest floor as their breeding site (Inger & Stuebing, 1997). The arboreal toad, *Pedostibes hosii*, was found croaking from tree branches near a small river after heavy rain. These toads spend most of their time deep in the forest and only go to the river or pond for breeding. Two puddle frogs, i.e. *O. laevis* and *O. lima*, were found in the swamps and puddles near NERC and these frogs use this type of water bodies as their breeding sites.

From the total number of the amphibians, six species (including *F. limnocharis, H. erythraea, K. pulchra, M. butleri, M. heymonsi* and *P. leucomystax*) are considered as commensal species associated with human activities. These frogs have a generalized habitat and are commonly found in disturbed areas up to the forest edge. It is important to note that these species could be used as a bio-indicator to determine forest disturbances. Meanwhile, certain species such as *P. aspera, H. glandulosa* and *L. blythii* could adapt and are found in moderately disturbed forests. The others are typical forest frogs that have a specialist habitat and can be found only in the forest environment. The study was more focused on the frog fauna around the natural water bodies, such as streams and swamps, compared to forest floor and tree canopy. As a result, more riparian species were captured compared to the others. Thus, other methods of collection (e.g. pit-fall traps) are suggested to capture more forest floor fauna in future studies.

Several species of lizards, such as *G. mutilata, H. frenatus, C. versicolor* and *E. multifasciata*, could be easily found around NERC (base camp). These commensal species have a general habitat and can survive around human habitation. Among other, *Gehyra mutilata* and *H. frenatus* inhabit the buildings and chalets, while *C. versicolor* and *E. multifasciata* were found in the bushes, garden and open areas around NERC.

The others are forest lizards and their main habitat is in the forest. Sometimes, some species of lizards, such as the giant forest lizard, *G. smithii* and spotted lizards, *G. monarchus*, were found entering the buildings in NERC. They are usually found crawling on the wall and ceiling of the

building looking for insects at night. The availability of food might be the reason for this particular species to enter the buildings from the nearby forest. Meanwhile, species like *C. consobrinus* could be found perching on tree trunk, buttress or holes of tree stumps at night in the forest that are close to the rivers.

Agamid lizards, such as *G. grandis and B. cristata,* can be found perching on tree trunks and three branches near the stream in the forest. These species prefer primary and secondary forests but they can be found near the base camp at times. Meanwhile, species like *S. scotophilus* is active at day time and can be sighted foraging near the small stream in the forest. The water monitor, *V. Salvatore,* is also active at day time and can be found in almost all types of environment, especially near the swamps and rivers.

On the contrary, snakes were rather difficult to locate because of their elusive behaviour and camouflage characteristics. In this study, only 11 species of snakes were observed and most of them were sighted in the forest, specifically near the streams and swampy areas. Only four species of snakes, namely *A. mycterizans, D. pictus, T. wiroti* and *N. kaouthia,* were found around the base camp and forest edge. The current checklist of amphibians and reptiles in Peta area is by no mean complete, as more studies are definitely needed for that purpose.

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