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Additions to The Herpetofauna of Pasoh Forest Reserve, Negeri Sembilan, Peninsular Malaysia

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Abstrak: Satu survei herpetofauna telah dijalankan di Hutan Simpan Pasoh dari 13–19 Disember 2007 dan 20–24 Januari 2008. Sebanyak 23 spesies reptilia dan amphibia berjaya dijumpai, termasuk lima spesies yang merupakan rekod baru untuk Hutan Simpan Pasoh. Senarai spesies terbaru yang juga mengandungi hasil kajian-kajian lepas disediakan.

Kata kunci: Amfibia, Reptilia, Senarai Spesies, Survei

Abstract: A survey was carried out at the Pasoh Forest Reserve from 13–19 December, 2007 and 20–24 January, 2008, to inventory the herpetofauna contained therein. A total of 23 species of reptiles and amphibians were collected during this survey, five of which have not previously been recorded in the Pasoh Forest Reserve. An updated checklist which incorporates findings from previous studies is presented.

Keywords: Amphibians, Reptiles, Checklist, Survey

INTRODUCTION

Pasoh Forest Reserve (Pasoh FR) (Fig. 1) is one of the most well-studied remnants of lowland tropical forest in Southeast Asia and has been the focal point for international field studies since the 1970's. Francis (1989, 1990), Kemper (1988), Kemper and Bell (1985) and Yasuda (1998) conducted thorough research on mammals while the avian fauna was studied by Wells (1978) and Wong (1985, 1986), whose work documented over 200 species of birds. Various herpetofaunal surveys were carried out in the primary and regenerating forests between 1968 and 2003. Reports were made by Lim (1974, 1991) in conjunction with small mammal studies, Kiew (1978, 1984) and Kiew *et al.* (1996), based on occasional and opportunistic findings. The latest checklists were provided by Lim and Norsham (2003) and Norsham and Sukumaran (2006) which collectively reported a total of 92 species of reptiles and amphibians (43 amphibians; 49 reptiles). This paper provides an updated and revised checklist of the herpetofauna of Pasoh FR with the addition of five new species records.

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Figure 1: Location of Pasoh Forest Reserve in Peninsular Malaysia

MATERIALS AND METHODS

Surveys were carried out from 13–19 December, 2007 and 20–24 January, 2008 in the regenerating forest surrounding the Pasoh Field Station (2° 58' 57" N, 102° 18' 20" E) both during the day and night. Collections were concentrated along jungle trails and specimens were captured by hand or with blowpipes. Selected specimens were photographed and euthanized for preservation with tricane (ethyl 3-aminobenzoate methanesulfonate salt), fixed in 10% formalin and stored in 70% alcohol. Tissue samples were taken from selected specimens and stored in 100% alcohol. All specimens were deposited at the zoological museum in the Forest Research Institute of Malaysia (FRIM). Amphibian taxonomy follows Frost *et al.* (2006) and Che *et al*. (2007).

RESULTS

A total of 23 species of reptiles and amphibians were collected during this survey, five of which are new records for Pasoh FR. An updated checklist of amphibians (Table 1) and reptiles (Table 2) is presented below with discussions on new species records and taxonomic updates.

AMPHIBIA

Dicroglossidae
Fejervarya limnocharis (Gravenhorst 1829)
An adult male (HC00125) was found in a cement drain near the field station. A female (HC00145) was caught on the ground along Denai Alam forest trail.

Limnonectes plicatellus (Stoliczka 1873)
Two sub-adult females (HC00127 and HC00128) were collected in the vicinity of the field station.

Limnonectes malesianus (Kiew 1984)
A juvenile female (HC00137) was captured on bare soil in a desiccated ditch along the road leading out of the field station. This represents a new record for Pasoh FR.

Microhylidae
Kaloula baleata (Müller 1836)
An adult male (HC00134) was found on a tree trunk 2.5 m above the ground behind one of the chalets at Pasoh Field Station. An adult female (HC00147) was found along Denai Alam forest trail, also on a large tree trunk, 2 m above ground.

Microhyla mantheyi Parker 1928
This species was previously reported as *Microhyla borneensis.* This group was revised by Das *et al*. (2007), which restricted *M. borneensis* to Borneo and redescribed the populations in Peninsular Malaysia as *M. mantheyi*. Three females were collected as vouchers (HC00138, HC00139, and HC00140). These were the most frequently-encountered microhylids and were found in abundance in leaf litters along the Denai Alam forest trail and the surrounding areas of the field station.

Microhyla heymonsi Vogt 1911
One specimen was observed on the dirt road leading out of the field station. No specimens were captured.

Ranidae
Hylarana laterimaculata (Barbour & Noble 1916)
One adult male was observed calling from the ground along the Denai Alam forest trail. No specimens were captured.

Hylarana labialis (Peters 1871)
A female specimen (HC00131) was found on a leaf, 0.5 m above the ground by the edge of an intermittent swamp along the Denai Alam forest trail. Previously known as *Hylarana raniceps*, but redescribed as *H. labialis* by Inger *et al.* (2009).

Rhacophoridae
Rhacophorus pardalis Günther 1858
An adult female (HC00146) was found on a leaf, 0.5 m above the ground by the edge of a stream along the Denai Alam forest trail.

REPTILIA

Agamidae
Draco formosus Boulenger 1900
An adult female (HC00141) was caught 4 m above the ground by the field station at 1330 h. This constitutes a new record for Pasoh FR.

Draco sumatranus Schlegel 1844
McGuire and Kiew (2001) demonstrated that *Draco volans* and *D. sumatranus* are two distinct species that are allopatrically distributed and diagnosable. The populations in Peninsular Malaysia are *D. sumatranus*, whereas *D. volans* occurs in Java and other parts of the Sunda Shelf.

Gekkonidae
Cyrtodactylus quadrivirgatus Taylor 1962
Two individuals were found along Denai Alam forest trail at night. Both were found on leaves 0.5 m above the ground. One adult female (HC00132) was collected as a voucher. This represents a new record for Pasoh FR.

Cnemaspis kendallii (Gray 1845)
One individual was observed on a vertical tree trunk along the Denai Alam forest trail at 1330 h. No voucher specimens were collected and this remains an unconfirmed new record.

Colubridae
Lycodon albofuscus (Duméril *et al.* 1854)
An adult female (HC00142) was found foraging at night on a shrub, 1 m above the ground along the Denai Alam trail. This is a new record for Pasoh FR.

DISCUSSION

Despite extensive studies that have been carried out in the past, new species records are still being discovered in the Pasoh FR (*L. malesianus, C. kendallii, C. quadrivirgatus, D. formosus, L. albofuscus*). This indicates that the actual diversity of the herpetofauna in Pasoh FR is not yet fully realized and additional new records can be expected with further surveys. It has been demonstrated that intensive and systematic surveys of areas that have been pre-sampled can still result in the discovery of many new records (Grismer *et al.* 2006a, b; Wood *et al.* 2008). Repeated samplings over a long period of time, encompassing varying microhabitats, during different seasonal periods, are needed before the

biodiversity of a selected area can be fully understood. Sampling methods such as pit-fall traps can also be employed for long-term monitoring and distribution studies (Chan *et al.* forthcoming). To date, 97 species of herpetofauna (44 amphibians; 53 reptiles) have been recorded for Pasoh FR. This healthy assemblage of herpetofauna is a positive indication that the regenerative forest at Pasoh FR is recovering, and underscores the importance of its conservation as a safe haven for flora and fauna in a region that has been vastly extirpated to make way for agriculture.

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Appendix

Table 1: Amphibians of Pasoh Forest Reserve, Negeri Sembilan, Peninsular Malaysia.

	Reported by			
Taxa	Kiew *et al.* (1996)	Lim & Norsham (2003)	Norsham & Sukumaran (2006)	This study
Bufonidae				
Ingerophrynus parvus (Boulenger 1887)		X	X	
Leptophryne borbonica (Tschudi 1839)		X		
Duttaphrynus melanostictus (Schneider 1799)		X		
Phrynoidis aspera (Gravenhorst 1829)		X		
Dicroglossidae				
Fejervarya limnocharis (Gravenhorst 1829)		X	X	X
Limnonectes blythii (Boulenger 1920)		X	X	X
Limnonectes laticeps (Boulenger 1882)		X		
Limnonectes malesianus (Kiew 1984)				X*
Limnonectes paramacrodon (Inger 1966)		X	X	
Limnonectes plicatellus (Stoliczka 1873)			X	X
Occidozyga laevis (Günther, 1858)		X		
Megophryidae				
Leptobrachium hendricksoni Taylor 1962		X		
Leptobrachium nigrops Berry & Hendrickson 1963		X		
Megophrys nasuta (Schlegel 1858)		X		
Microhylidae				
Chaperina fusca Mocquard 1892	X			
Kalophrynus palmatissumus Kiew 1984	X		X	
Kalophrynus pleurostigma Tschudi 1838	X			
Kaloula baleata (Müller 1836)			X	X
Kaloula pulchra Gray 1831	X			
Microhyla berdmorei (Blyth 1856)		X		
Microhyla butleri Boulenger 1900	X			
Microhyla heymonsi Vogt 1911		X	X	X
Microhyla mantheyi Parker 1928			X	X
Microhyla superciliaris Parker 1928	X			
Micryletta inornata (Boulenger 1890)	X			
Ranidae				
Humerana miopus (Boulenger 1918)			X	
Hylarana baramica (Boettger 1901)		X		
Hylarana erythraea (Schlegel 1837)		X		
Hylarana glandulosa (Boulenger 1882)		X	X	X

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Table 1: *(continued)*

Taxa	Reported by			
	Kiew *et al.* (1996)	Lim & Norsham (2003)	Norsham & Sukumaran (2006)	This study
Hylarana labialis (Peters 1871)		X	X	X
Hylarana laterimaculata (Barbour & Noble 1916)			X	X
Hylarana luctuosa (Peters 1871)		X		
Hylarana nicobariensis (Stoliczka 1870)		X	X	X
Hylarana picturata (Günther 1872)	X		X	
Odorrana hosii (Boulenger 1891)		X		X
Rhacophoridae				
Nyctixalus pictus (Peters 1871)	X		X	
Polypedates colletti (Boulenger 1890)		X		
Polypedates leucomystax Gravenhorst 1829		X	X	
Polypedates macrotis (Boulenger 1891)		X	X	
Rhacophorus appendiculatus (Günther 1858)		X	X	
Rhacophorus cyanopunctatus Manthey & Steioff 1998	X			
Rhacophorus nigropalmatus Boulenger 1895		X		
Rhacophorus pardalis Günther 1858			X	X
Rhacophorus prominanus Smith 1924		X		

X* = new record

Table 2: Reptiles of Pasoh FR, Negeri Sembilan, Peninsular Malaysia.

Taxa	Reported by	
	Lim & Norsham (2003)	This study
TURTLES		
Bataguridae		
Heosemys spinosa (Gray 1831)	X	
Notochelys platynota (Gray 1834)	X	
Testudinidae		
Manouria emys (Schlegel & Müller 1844)	X	
Trionychidae		
Dogania subplana (Geoffroy 1809)	X	

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Table 2: *(continued)*

	Reported by	
Taxa	Lim & Norsham (2003)	This study
LIZARDS,SKINKS		
Agamidae		
Acanthosaura armata (Gray 1827)	X	
Aphaniotis fusca (Peters 1864)	X	
Bronchocela cristatella (Kuhl 1820)	X	
Draco fimbriatus Kuhl 1820	X	
Draco formosus Boulenger 1900		X*
Draco maximus Boulenger 1893	X	
Draco melanopogon Boulenger 1887	X	X
Draco quinquefasciatus Hardwicke & Gray 1827	X	
Draco sumatranus Schlegel 1844	X	
Gonocephalus bellii (Duméril & Bibron 1837)	X	
Varanidae		
Varanus dumerilii (Schlegel 1839)	X	
Varanus bengalensis nebulosus (Gray 1831)	X	
Varanus rudicollis Gray 1845	X	
Varanus salvator (Laurenti 1768)	X	
Scincidae		
Eutropis longicaudata (Hallowell 1857)	X	
Eutropis multifasciata (Kuhl 1820)	X	
Eublepharidae		
Aeluroscalabotes felinus (Günther 1864)	X	
Gekkonidae		
Cnemaspis kendallii (Gray 1845)		X* (unconfirmed)
Cyrtodactylus consobrinus (Peters 1871)	X	X
Cyrtodactylus pulchellus Gray 1827	X	
Cyrtodactylus quadrivirgatus Taylor 1962		X*
Gekko smithii (Gray 1842)	X	X
Ptychozoon kuhli Stejneger 1902	X	
SNAKES		
Xenopeltidae		
Xenopeltis unicolor Reinwardt 1827	X	

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Table 2: *(continued)*

	Reported by	
Taxa	Lim & Norsham (2003)	This study
Pythonidae		
Python reticulatus (Schneider 1801)	X	
Colubridae		
Ahaetulla prasina (Boie 1827)	X	
Aplopeltura boa (Boie 1828)	X	
Boiga cynodon (Boie 1827)	X	
Boiga dendrophila (Boie 1827)	X	X
Boiga nigriceps (Günther 1863)	X	
Calamaria lovii Boulenger 1887	X	
Calamaria lumbricoidea Boie 1827	X	
Chrysopelea paradisi Boie 1827	X	
Dendrelaphis formosus (Boie 1827)	X	
Dendrelaphis pictus (Gmelin 1789)	X	
Enhydris bocourti (Jan 1865)	X	
Gonyosoma oxycephalum (Boie 1827)	X	
Lycodon albofuscus (Duméril *et al.* 1854)		X*
Macropisthodon flaviceps (Duméril *et al.* 1854)	X	
Macropisthodon rhodomelas (Boie 1827)	X	X
Oligodon purpurascens (Schlegel 1837)	X	
Psammodynastes pictus Günther 1858	X	
Pseudorabdion longiceps (Cantor 1847)	X	X
Sibynophis melanocephalus (Gray 1835)	X	
Elapidae		
Calliophis bivirgatus (Boie 1827)	X	
Naja sumatrana Müller 1887	X	
Ophiophagus hannah (Cantor 1836)	X	
Viperidae		
Parias hageni (van Lidth de Jeude 1886)	X	
Tropidolaemus wagleri (Boie 1827)	X	

X* = new record