

CHECKLIST OF HERPETOFAUNA OF TASEK BERA RAMSAR SITE, PAHANG

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ABSTRACT

Tasek Bera Ramsar Site (TBRS) in Pahang is the largest freshwater wetland in Peninsular Malaysia and is protected under the Ramsar Convention. There are varieties of ecosystem around this wetland which support the biodiversity of flora and fauna including herpetofauna. A survey of herpetofauna in TBRS was conducted between 7th and 14th May 2014 to review the species richness in this natural wetland area. Throughout the survey, amphibians and reptiles were actively searched along the lake site, interpretive trails and nearby forests. The captured individuals were photographed and morphology measurements were taken for species identification. A total of 34 individuals comprising of 17 species were caught. Out of these 17 species, five species were amphibians from four families (Bufonidae=1; Ranidae = 2; Rhacophoridae= 1; Dicroglossidae=1), five species were snakes from three families (Colubridae=3; Elapidae=1; Viperidae=1) and seven species of lizards from three families (Agamidae=1; Gekkonidae=5; Varanidae=1). The ratio number of individual of amphibians to reptiles captured was almost equal (16:18). The highest captured individuals were from Family Gekkonidae. *Hylarana erythraea* and *Gekko monarchus* were the most captured species with six individuals each. These survey findings will be helpful in the management and conservation plan of wildlife, specifically herpetofauna of TBRS.

Keywords: Herpetofauna, survey, wetland, Tasek Bera Ramsar Site, amphibian and reptile.

Received (02-May-2018); Accepted (19-July-2019); Available online (18-October-2019)

Citation: Munisamy, B., Kamaruddin, K.N., Zamahsasri, A.I., Ithnin, H. & Razali, M.F. (2019). Checklist of herpetofauna of Tasek Bera Ramsar Site, Pahang. *Journal of Wildlife and Parks*, **34**: In press.

INTRODUCTION

Malaysian wetland ecosystem with its hot and wet tropical climate provides a very conducive environment for the existence of diversity of amphibians and the reptiles. Up to date, more than 108 species of amphibians, 156 species of snakes, and 108 species of lizard were recorded in Peninsular Malaysia (Chan *et al.*, 2010).

Tasek Bera Ramsar Site (TBRS) is Malaysia's first protected freshwater wetland with international importance under the Ramsar Convention since November 1994. Located within Pahang River water catchments area in Bera district, this wetland is the largest freshwater swamp in Peninsular Malaysia. This water catchment area covers 61,380 ha, while the TBRS

covers 31,120 ha. The lake water drains into the Pahang River. TBRs wetland area consists of diverging inflowing streams and swamps, surrounded by reedbeds, ponds, lakes, rivers, dry lowland forests, freshwater swamps, *Pandanus* and blackwater swamps ecosystems. These varieties of ecosystems support diversities of wildlife, where more than 200 species of birds, 50 species of mammals, and 90 species of fish were recorded (Chong, 2007). The lake and the surrounding areas also sustain the livelihood of the *Semelai* indigenous tribe. Other than this, the wetland contributes socio-economically to ecotourism industry and also as flora and fauna research site for scientists, including herpetofauna diversity research.

However, up to date only a few herpetofauna diversity surveys were conducted at this Ramsar site (Kiew, 1972; Lim, 1998; Norsham *et al.*, 2000; Shaaruddin *et al.*, 2008; PERHILITAN, 2009) especially at TBRs. The first survey of frogs at Tasik Bera was recorded by Kiew (1972), where the author describes the discovery of new amphibian species of Peninsular Malaysia. Later, a baseline survey of frogs at this wetland recorded a total of 19 species of frogs from nine genera and five families (Lim, 1998). Following this, Norsham *et al.* (2000) recorded a total of 60 species of amphibians and reptiles within 11 sites in TBRs which comprised 19 species of amphibians (frogs and toads), eight species of freshwater Testudines, 15 species of lizards and 18 species of snakes. In 2008, Shaaruddin *et al.* (2008) described the distribution and genetic diversity of frog species in TBRs, where they yielded eight different species belonging to four families namely Bufonidae, Ranidae, Rhacophoridae, and Microhylidae. More recently in 2009, the Department of Wildlife and National Parks, Peninsular Malaysia's (PERHILITAN) conducted an inventory of herpetofauna at TBRs and documented 27 species of amphibians from six families and 13 species of reptiles from six families (PERHILITAN, 2009). To review the herpetofaunal species richness in this natural wetland area, a survey was conducted at TBRs between 7th and 14th May 2014 and the findings are reported in this study.

MATERIALS AND METHODS

Sampling Site, Collection, and Identification

The field survey was conducted at TBRs, Pahang between 7th and 14th May 2014 as a part of PERHILITAN's National Biodiversity Inventory Programme. The Management Unit Office of TBRs (GPS: 3.1308902, 102.6090455) were used as basecamp. The intended sampling location was the suitable microhabitat for amphibian and reptiles in the forest, swamps, abandoned buildings, lakeside, and along interpretive trails nearby the basecamp.

The sample collection was conducted at day and night time by a field party consisting of 3-4 people by both active searches and opportunistic encounters. Headlamps were used for night searching. The encountered amphibians and reptiles were then caught by hand or scoop net before being placed into plastic bags and brought to basecamp. Each specimen were photographed, and morphological measurements such as snout-to-vent, tibia, total body length, head width and bodyweight of the specimens were measured following Norhayati *et al.* (2007). Species identification was conducted following Cox *et al.* (1998), Inger *et al.* (2005) and Norhayati *et al.* (2009). After identification, the animals were released back to their natural habitat.

RESULTS AND DISCUSSION

In total, 34 individuals representing 12 frogs, four toads, five snakes, and 13 lizards were recorded during the survey period (Table 1; Figure 1). Seventeen species of herpetofauna were captured which consists of five frogs and toads species from four families (Bufonidae= 1; Dicroglossidae= 1; Rhacophoridae= 1; Ranidae= 2), five species of snakes from three families (Elapidae= 1; Viperidae= 1; Colubridae= 3) and seven species of lizards from three families (Agamidae= 1; Varanidae= 1; Gekkonidae= 5). The ratio of the number of individual amphibians to reptiles captured was almost equal (16:18). Gekkonidae represents the highest number of individual capture. *Hylarana erythraea* and *Gekko monarchus* were the most captured species, with six individuals, respectively, followed by *Duttaphrynus melanostictus* and *Fejervarya limnocharis* (four and three individuals, respectively). For most of the species only single individuals were captured.

Table 1 A list of the herpetofauna of TBRS with global International Union for Conservation of Nature (IUCN) status and population trend (IUCN, 2019)

Family	Species	N	IUCN Status and population trend
Frogs and toads			
Bufonidae	<i>Duttaphrynus melanostictus</i>	4	Least concern, Increasing
Dicroglossidae	<i>Fejervarya limnocharis</i>	3	Least concern, Stable
Rhacophoridae	<i>Polypedates leucomystax</i>	2	Least concern, Stable
Ranidae	<i>Hylarana erythraea</i>	6	Least concern, Stable
Ranidae	<i>Humerana miopus</i>	1	Least concern, Unknown
Snakes			
Elapidae	<i>Calliophis bivirgatus</i>	1	NA
Viperidae	<i>Tropidolaemus wagleri</i>	1	Least concern, Stable
Colubridae	<i>Dendrelaphis striatus</i>	1	Least concern, Unknown
Colubridae	<i>Macropisthodan flaviceps</i>	1	NA
Colubridae	<i>Chrysopelea ornata</i>	1	NA
Lizards			
Agamidae	<i>Gonocephalus liogaster</i>	1	NA
Varanidae	<i>Varanus nebulosus</i>	1	NA
Gekkonidae	<i>Gehyra mutilate</i>	1	NA
Gekkonidae	<i>Gekko monarchus</i>	6	NA
Gekkonidae	<i>Gekko smithii</i>	1	Least concern, Unknown
Gekkonidae	<i>Hemidactylus garnotii</i>	2	NA
Gekkonidae	<i>Cyrtodactylus consobrinus</i>	1	NA

NA= Not available

Generally, the numbers of species collected in our survey were less compared to previous surveys (Kiew, 1972; Lim, 1998; Norsham *et al.*, 2000; PERHILITAN, 2009). This can be explained by the fact that the sample collection is entirely dependent on opportunistic sightings. Furthermore, the difficulty in catching fast-moving herpetofauna such as snakes and lizards adds to this condition. Additionally, we also faced a problem in catching some species which are on the inaccessible location such as tree canopy. The number of species encountered during a survey usually increases with the numbers of survey sites. For example, the numbers of

species captured by Norsham *et al.* (2000) (60 species) is much higher compared to our numbers (17 species) in the same areas. This discrepancy can be attributed to the fact that the authors covered more sites (11 sites), while we focused exclusively on a single site. On the other hand, efforts being put such as workforce and duration of survey, as well as equipment being used, plays an important role in increasing the numbers of species captured.



Figure 1 Herpetofauna of Tasik Bera Ramsar Site; A: *Duttaphrynus melanostictus*, B: *Hylarana erythraea*, C: *Fejervarya limnocharis*, D: *Polypedates leucomystax*, E: *Humerana miopus*, F: *Gonocephalus liogaster*, G: *Cyrtodactylus consobrinus*, H: *Varanus nebulosus*, I: *Gekko monarchus*, J: *Gekko smithii*, K: *Macropisthodan flaviceps*, L: *Tropidolaemus wagleri*, M: *Dendrelaphis striatus*, N: *Calliophis bivirgatus*, O: *Chrysopelea ornate*

The number of individual of *H. erythrae* captured were relatively higher compared to other species of amphibians. This indicates that it might be the dominant frog species of TBRS, due to the habitat suitability as this species inhabit subtropical or tropical moist montane forests, freshwater lakes, wetlands, introduced vegetation and swamps (IUCN SSC Amphibian Specialist Group, 2014).

The almost equal ratio number of amphibians to reptiles (16:18) captured indicates that the lake habitat environment provides equal living sustainability for both amphibians and reptiles. This ratio also indicates that unbiased methodology was used during sampling.

Almost half of the species captured were identified as Least Concern species as categorised by the IUCN Red List of Threatened Species, while the remaining half have insufficient data available for any assessment to be conducted. Therefore, more studies and survey data are needed to update the status and population trend of herpetofauna, particularly in TBRS. These survey findings will be helpful in the management and conservation plan of wildlife, specifically herpetofauna of TBRS.

ACKNOWLEDGEMENTS

We wish to thank the organiser of the National Biodiversity Inventory Programme 2014, Department of Wildlife and National Parks.

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