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**Short Communication**

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**A survey of amphibians at Liwagu Water Catchment Area, Tambunan, Sabah, Malaysia**

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**ABSTRACT.** This paper presents the inventory of frogs collected at Liwagu Water Catchment, Tambunan, Sabah. The specimens were collected along trails using the Visual Encounter Survey (VES) and hand-grabbing technique. The process of collecting and recording data was done according to the standard method for handling amphibians. A total of 15 species of anurans and one species of caecilian were recorded. The assemblage was dominated by anurans from Ranidae (39%).

*Keywords:* Frogs, water catchment, Ranidae.

**INTRODUCTION**

Frogs are important biotic components of many ecosystems, as they are claimed to be common prey for many medium to large-sized vertebrates, and act as predators of various insects and other small vertebrates. Hence, a significant loss of biomass due to habitat disturbance will disrupt the prey-predator cycle (Formanowicz & Bobka, 1989; Norhayati *et al.*, 2005; Sredl & Collins, 1992; Werner & McPeck, 1994). Moreover, due to their moist, semi-permeable skin, frogs are very sensitive towards physical changes in the environment (Inger & Stuebing, 2005). The condition of a disturbed environment can sometimes be determined by studying frog species dwelling in the area, for example by comparing species occurrence in old, disturbed or fragmented forests (Porter, 2010). Thus, frog communities in an ecosystem can serve as a good biological indicator for monitoring any changes in the

ecosystem (Beebee, 1996; Duellman & Trueb, 1994; Mertz *et al.*, 2005; Stewart & Woolbright, 1996).

The Liwagu Scientific Expedition carried out from 10<sup>th</sup> to 14<sup>th</sup> November 2011 in the Liwagu sub-catchment area in Tambunan, Sabah was jointly organised by WWF-Malaysia and Universiti Malaysia Sabah. The purpose of the expedition was to gather important information to support sustainable management of freshwater and water catchment. This paper reports the outcome of the inventory on amphibian fauna.

**METHODS**

Sampling was done at three locations: Sungai (river) Nukakatan (paddy fields on both sides), Kitahom Waterfall (sandy stream bed) and Sungai Kolombuong (rocky river bed). The Visual Encounter Survey was applied throughout this expedition (Heyer *et al.*, 1994). Additionally, the Hand-grabbing technique (Heyer *et al.*, 1994; Matsui, 2006) was applied in this study and captured frogs were placed in separate plastic bags. Details, such as date and time of capture, microhabitat and weather were recorded on data sheets as such information is very helpful for future studies. All of the collected specimens were processed the following day. Specimens were taxonomically identified to species based on their morphological characteristics using the key by Malkmus *et al.* (2002) and Inger & Stuebing (2005). The specimens were euthanized using

chlorobutanol, fixed in 10% formalin, and subsequently transferred to 90% ethanol for long-term preservation and deposited in BORNEENSIS, Universiti Malaysia Sabah (UMS).

## RESULTS AND DISCUSSION

A total of 31 individuals of frogs and one caecilian species were collected during this expedition (Table 1 and Figure 1).

There were only six frog species encountered on the first night of sampling (Figure 1). *Meristogenys orphnocnemis*, *M. phaeomerus* and *Staurois latopalpmatus* were among the frogs collected from Sungai Nukakatan. The presence of these frogs indicated that Sungai Nukakatan was a clear stream with high dissolved oxygen. Meanwhile, *Fejervarya limnocharis* (Grass frog), *Limnonectes kuhlii* (Kuhl's creek frog) and *Polypedates leucomystax* (Four-lined tree frog) sighted near paddy fields along Sungai Nukakatan are not uncommon as they associate

well in open areas that are associated to human activities (Beebee, 1996, Malkmus *et al.*, 2002; Inger & Stuebing, 2005).

During the sampling at Kintahum waterfall, bufonid frog species *M. orphnocnemis*, *L. khulii*, *Chaperina fusca* and *Kalophrymus heterochirus* were encountered (Figure 2). *Chaperina fusca* and *K. heterochirus* are terrestrial frogs, which normally inhabit primary and secondary forests (Beebee, 1996; Inger & Stuebing, 2005).

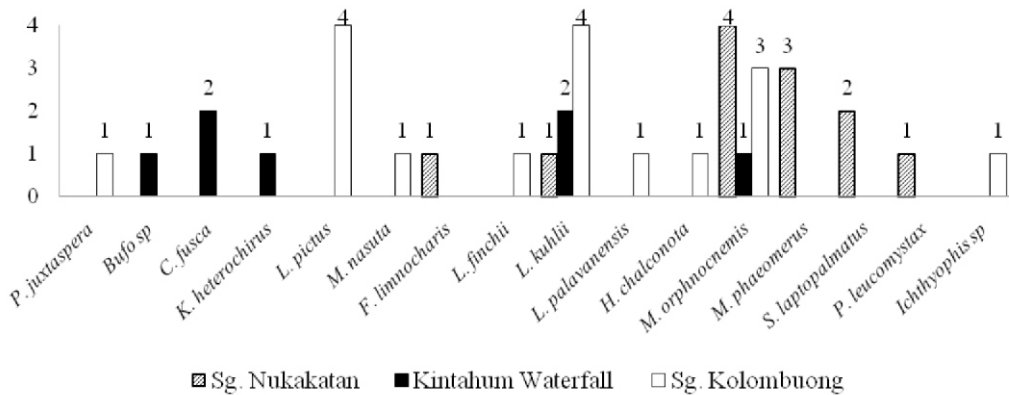
We also encountered *Megophrys nasuta* (Bornean horned frog), *Leptotalax pictus*, *Hylarana chalconota*, *Phrynonidis juxtaspera*, *Limnonectes finchii* and *L. palavanensis* at Sungai Kolombuung (Figure 2). We have yet to completely identify one bufonid specimen and a caecilian.

Most specimens were caught near the river. Considering favourable weather conditions during the survey, we anticipate many more individuals would have been caught if we had more time and more sampling sites.

**Table 1.** List of amphibian species encountered.

Order	Family	Species	
ANURA	Bufonidae	<i>Phrynonidis juxtaspera</i> <i>Bufo</i> sp.	
	Microhylidae	<i>Chaperina fusca</i> <i>Kalophrymus heterochirus</i> *	
	Megophryidae	<i>Leptotalax pictus</i> <i>Megophrys nasuta</i>	
	Dicroglossidae	<i>Fejervarya limnocharis</i> <i>Limnonectes finchi</i> * <i>Limnonectes kuhlii</i> <i>Limnonectes palavanensis</i>	
	Ranidae	<i>Hylarana chalconota</i> <i>Meristogenys orphnocnemis</i> * <i>Meristogenys phaeomerus</i> * <i>Staurois latopalpmatus</i> *	
	Rhacophoridae	<i>Polypedates leucomystax</i>	
	GYMNOPHIONA	Ichthyophiidae	<i>Ichthyophis</i> sp.

\*Species endemic to Borneo Island.



**Figure 1.** Number of individual of amphibian encountered during the survey at three localities.

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