DIVERSITY OF ANURANS AT TRUS MADI, SABAH

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ABSTRACT

A study on the diversity of anurans at Trus Madi, Sabah, was carried out at three sites on 30th October – 4th November 2001. The study was aimed to draw up an inventory of anurans at Trus Madi, as well as enhance the anuran collection of BORNEENSIS, Institute for Tropical Biology and Conservation (ITBC), Universiti Malaysia Sabah (UMS). Anurans were located through opportunistic examination, calls, and eye shines due to reflection from torchlights and headlamps. A total of 11 species from seven genera and five families were sampled. The study also contributed voucher specimens of three species to BORNEENSIS, namely *Leptobrachella baluensis*, *Rhacophorus harrissoni* and *Philautus bunitus*.

Key words: anurans, Trus Madi, inventory, voucher specimens, BORNEENSIS, Sabah

INTRODUCTION

Trus Madi is the second highest mountain in Sabah as well as Malaysia with a peak of 2,642 m above sea level at coordinate 5º 33' 30" N 116º 30' E in Tambunan District. The mountain stands in the middle of Trus Madi Range: a 80 km long range stretching over Tambunan, Ranau and Keningau Districts. The range plays a role of being a major water catchment area for numerous rivers such as Sungai Pegalan, Sungai Labuk and the longest river in Sabah and Malaysia, Sungai Kinabatangan.

The flora of Trus Madi denotes a wide spectrum of variations in accordance to increasing elevation (Acres, 1972). The lowland forest zone has a mixture of Dipterocarp and montane species. The lower montane forest zone at 1,500 m – 1,850 m / 2,000 m houses a limited number of Dipterocarp trees, and palm species which form the understories. The upper montane forest zone at 1,850 m / 2,000 m – 2,500 m has the typically knobbly trees and epiphytic ferns. The summit scrub zone at 2,500 m – 2,640 m opens up to shrub

and liana species. Kitayama *et al.* (1993) stated that the summit scrub zone is extensively unique to Trus Madi. Unfortunately, logging has been escalating in size and elevation, especially since late 1980s, for commercial timber species, e.g. *Agathis* trees.

The fauna of Trus Madi is sadly less known compared to its flora. To date, only a few explorations and expeditions to survey the fauna of Trus Madi have been done. The earliest expedition was carried out by Bryant *et al.* in 1956. The record on herpetofauna was confined to snakes. Thus, a study on the diversity of anurans at Trus Madi is indeed required to add on to the faunal checklist, and initiate an anuran inventory of Trus Madi.

SITES AND METHODS

Anuran collections were carried out at three sites as described in Table 1 on five consecutive nights from 30th October – 4th November 2001. Opportunistic examinations for 2 – 4 hours from 2000 h onwards for each collection were done on puddles, temporary ponds, streams, stream banks, seepages, fallen trees, rotten logs, leave litters and rocks in streams. Anurans were also located through their calls, and eye shines due to reflection from torchlights and headlamps. These collection techniques were employed to yield holistic specimens of arboreal, terrestrial and riparian anurans (e.g., Inger, 1980; Abdul Hamid & Wong, 1998; Andreone *et al.*, 1998; Klemens, 1998; Christovol *et al.*, 1999; Inger *et al.*, 2000; Ramlah *et al.*, 2001; Kueh *et al.*, 2002; Kueh & Maryati, 2003). The anurans were captured by hand and put into separate plastic bags to be kept overnight. On the following day, the anurans were identified, recorded and photographed. The anurans were killed by a Chlorobutanol solution to keep the specimens soft and so, ease setting. The specimens were labelled with BORNEENSIS numbers. Specimens set were sprayed with 10% formalin, and fleshy specimens were injected with 10% formalin into the abdominal cavities, limbs and necks. Subsequently, the specimens were fixed in 10% formalin in covered trays overnight before were stored in container with the similar solution until returning to the Institute for Tropical Biology and Conservation (ITBC), Universiti Malaysia Sabah (UMS). Then, the specimens were rinsed and put into specimen jars with 70% ethanol for long term preservation.

Table 1. Sites of anuran collections.

Site	Description	Coordinate
A	Base Camp at 1,400 m above sea level.	5º 35.130' N 116º 29.395' E
B	Old logging (about 200 m from the Base Camp) at 1,416 m – 1,447 m above sea level.	5º 35.193' N 116º 29.394' E
C	Sungai Monsok (about 500 m from the Base Camp) at 1,344 m above sea level (Fig 1 & 2).	5º 34.820' N 116º 29.492' E

Fig 1 & 2. Anuran collection Site C.

RESULTS AND DISCUSSION

A total of 11 species of anurans from seven genera and five families were sampled from Trus Madi (Table 2). One species and one genus from the family Megophryidae, two species and one genus from the family Bufonidae, one species and one genus from the family Microhylidae, four species and two genera from the family Ranidae, and three species and two genera from the family Rhacophoridae.

Table 2. Anurans sampled from Trus Madi, Sabah.

Family	Species	Common name	Number of specimens
MEGOPHRYIDAE	*Leptobrachella baluensis* Smith	Kinabalu dwarf litter frog	1
BUFONIDAE	*Ansonia hanitschi* Inger	Kinabalu slender toad	6
	Ansonia longidigita Inger	Long-fingered slender toad	1
MICROHYLIDAE	*Chaperina fusca* Mocquard	Saffron-bellied frog (Fig 3)	3
RANIDAE	*Limnonectes kuhlii* (Dumeril & Bibron)	Kuhl's creek frog (Fig 4)	11
	Limnonectes palavanensis (Boulenger)	Smooth guardian frog	2
	Staurois natator (Günther)	Black-spotted rock frog (Fig 5)	1
	Staurois tuberilinguis Boulenger	Green-spotted rock frog (Fig 6)	1
RHACOPHORIDAE	*Philautus bunitus* Inger, Stuebing & Tan	Green bush frog	1
	Rhacophorus harrissoni Inger & Haile	Brown tree frog	1
	Rhacophorus angulirostris Ahl	Masked tree frog (Fig 7)	5
Total			33

Fig 3. *Chaperina fusca* (Saffron-bellied frog).

Fig 4. *Limnonectes kuhlii* (Kuhl's creek frog).

Fig 5. *Staurois natator* (Black-spotted rock frog).

Fig 6. *Staurois tuberilinguis* (Green-spotted rock frog).

Fig 7. *Rhacophorus angulirostris* (Masked tree frog).

Even though Trus Madi is a submontane and montane forest, only four out of the 11 species sampled are associated with such a forest, namely *Leptobrachella baluensis*, *Ansonia hanitschi*, *Philautus bunitus* and *Rhacophorus angulirostris* (Inger & Stuebing, 1997; Inger & Tan, 1996). This could be attributed to two governing factors: collection sites, and duration. As the highest elevation covered in the study was 1,447 m above sea level at Site B but the highest peak is 2,642 m above sea level, there are still a wide gradient of elevations yet to be combed which shall definitely contribute to the collection of more submontane and montane anuran specimens. The collection duration for the study could also be prolonged to increase the collection of anuran specimens. On average, two additional species (to the inventory) of anurans were sampled daily in this study. This outcome is parallel to the results from other inventory-based studies at other localities, such as two additional species sampled at north-eastern Tabin Wildlife Reserve daily (Kueh & Maryati, 2003) as well as about three additional species sampled at Ulu Kimanis, Crocker Range National Park, daily (Kueh *et al.*, in press).

Most of the species sampled are species of primary or at least old secondary forest. Those species are exemplified by *Chaperina fusca*, *Limnonectes kuhlii*, *L. palavanensis*, *Staurois natator*, *S. tuberilinguis*, *Rhacophorus harrissoni* and *R. angulirostris*. There was no human settlement in the locality, but just long abandoned huts in vicinity to Site C and muddy path that used to be a logging road (Site B). Hence, the condition releases Trus Madi off the pressure exerted by humans and consequently, enable Trus Madi to house many primary or at least old secondary forest anuran species.

Zooming into the endemism of the anuran species sampled, interestingly seven out of the 11 species were endemic species to Borneo. Those species are *Leptobrachella baluensis*, *Ansonia hanitschi*, *A. longidigita*, *Staurois tuberilinguis*, *Philautus bunitus*, *Rhacophorus harrissoni* and *R. angulirostris*. Indeed, biogeographical research has denoted Trus Madi to be a locality of rather high endemism for anurans (Kueh *et al.*, 2002, 2004). Moreover, two of the seven species are in fact endemic to Sabah: *Philautus bunitus* and *Rhacophorus angulirostris*.

Pertinent to the high endemism for anurans and reliability of sightings of such anuran species, Trus Madi has the potential to be a site for 'Anurans Tourism' for Sabah and even Borneo. Kueh (2003) pinpointed seven characteristics for 'Anurans Tourism', and two of them are endemism as well as reliability of sightings as imperative draw cards for this new nature tourism product.

Voucher specimens for three species were also contributed to BORNEENSIS, ITBC, UMS. The species implicated are *Leptobrachella baluensis* (family Megophryidae), *Philautus bunitus* and *Rhacophorus harrissoni* (family Rhacophoridae).

CONCLUSION

The first ever inventory-based study of anurans at Trus Madi has generated intriguing results. A total of 11 species from seven genera and five families were sampled. Seven of those species are endemic to Borneo while two of which are endemic to Sabah. The study also contributed voucher specimens of three species to BORNEENSIS, namely *Leptobrachella baluensis*, *Rhacophorus harrissoni* and *Philautus bunitus*. Indeed, Trus Madi awaits many other studies on herpetology, biogeography, ecology and nature tourism to be done.

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