

A BRIEF NOTE ON FROGS OF BARIO, KELABIT HIGHLANDS, SARAWAK

Ramlah Zainuddin
Universiti Malaysia Sarawak

ABSTRACT

A total of 18 species with 144 individuals of anurans occurred in Bario and vicinity. This may be about half of the anurans species present in the area. The area was dominated by the family of Ranidae with 72% out of the total of the individuals captured. The remaining individuals were from the families of Pelobatidae, Bufonidae, Microhylidae and Rhacophoridae. Half of the species was found at the edge of primary forest of Lelang Baru Dam which was dominated by Rana picturata. In contrast, Rana kuhli was more abundant in secondary forest at Lubang Garam Pa' Umur and Kuari Trail.

INTRODUCTION

Borneo is widely known as an area of high biodiversity. Approximately 140 species of frogs occur in Borneo. However, Bario is not widely known for its biodiversity compared to other parts of Borneo. Little is known about animals and plants occurring in that plateau. This is due to inaccessibility of the area to the outside world that leads to discouragement of researchers to work in this area. The only collection of amphibian and reptiles from this area was done by Smith in 1925 at Mt. Murud and Inger (1966). Nothing has ever been done since then.

Bario (3° 45'N 115° 27'E) which is known as the Kelabit Highlands, is situated at the upper north of Sarawak Borneo. The area is a plateau with an altitude of approximately 1,200 meters above sea level and formed the uppermost catchment of Sg. Baram watershed. There are three major forests in Bario. The primary rainforest surrounds the native settlements and agricultural areas while the heath and secondary forests are located within the adjacent of the nearby villages.

The Bario Scientific Expedition was based at Bario Baru. The survey was conducted at Lubang Garam Pa' Umur, Lelang Baru Dam and a one-night sampling along the quarry trail. The purpose of this expedition was to survey the occurrence of amphibian and reptiles in Bario and vicinity. The survey was carried out for about two weeks in both localities.

METHODS

For both localities, forest night and stream transects were done in two hours. The animals were located by headlamps and caught by hand. Every morning for about two hours, tadpoles collections and forest floor quadrats were done. Tadpoles were caught by dipnet and electrode fishing. The animals were also searched along quarry trail but only for one night. All specimens were preserved in 10% formalin and later stored in 70% alcohol. Specimens were deposited at

UNIMAS Museum.

The specimens were identified by the author with the help of Dr. Robert Inger of Field Museum, Chicago.

RESULTS

A total of 18 species with 144 individuals of frogs and toads occurred in Bario and vicinity (Table 1). This only makes about 12.85% of the total species that occurred in Borneo. The low diversity may be due to incomplete survey of the amphibian fauna (not all habitats were searched in this expedition) and inaccessibility of the area to the outside world. Moreover, lack of personnel, expertise and time may affect the total collections.

Rana kuhli was abundant in all sites. However it was outnumbered by *Rana picturata* in Lelang Baru Dam. The reason may be due to the type of streams in the sampling sites. In Lelang Baru Dam, the streams were medium in size with rocky areas and strong current which was suitable for *Rana picturata*, while in Lubang Garam Pa' Umur and Kuari trail, the streams were wider and deeper with sandy gravel as the bedrocks of the streams. The latter is more suitable for *Rana kuhli*.

Polypedates macrotis was more abundant in quarry trail. These frogs gathered in large groups in vegetation over standing water in ditches along the trail (Inger and Stuebing, 1989). Also abundant in quarry trail was *Rana kuhli*. The small-sized stream with sandy gravel area may be a factor in contributing the abundance of this species here. List of species that occurred in Bario is shown in Table 1.

Different types of vegetation in sampling sites may also affect the occurrence of frog species in Bario. Lelang Baru Dam was dominated by Dipterocarpacea while Lubang Garam Pa' Umur was dominated by bamboo trees. Quarry trail, on the other hand, was dominated by heath forest vegetation which was very poor in nutrient. All these provided different microhabitats for the frogs. For example, *Rhacophorus bimaculatus* could be found in both Lelang Baru dam and Lubang Garam Pa' Umur but none in quarry trail.

The animals caught in forest floor quadrat were very poor in terms of time consumed and manpower involved. There were very few species caught in the quadrat such as *Leptobrachium abboti*, *Megophrys nasuta* and *Leptobrachium montanum*. The question arised whether this was due to the poor diversity of forest floor species in Bario or was it due to inexperience of the personnel involved in the collection trips. Both may be the reasons for the very poor catch of forest floor species.

Not many reptiles were caught during the survey The animals were caught accidentally along the trail and in the base camp. Funnel traps that were put in wallows, river banks and ponds in Lubang Garam Pa' Umur were used to catch the reptiles but unsuccessful. The encountered snakes were *Oligodon* sp., *Calamaria* sp., *Bungarus flaviceps* and *Liopeltis baliodeirus*. No

lizards were found during the survey.

Overall, the total collection was quite low in terms of diversity compared to other parts of Borneo such as Nanga Tekalit (Inger 1966). There was no reason, based on the collection (18 species), to expect a large fauna at Bario. A more prolonged time and adequate number of personnels should be provided if further study is to be carried out. More collecting in heath and primary forests, further-up river and higher up the hills can be expected to double the number of species found.

Table 1: The occurrence of frog species in Bario

FAMILY	SPECIES	NUMBER OF INDIVIDUALS		
		LGB (Lubang Garam Pa'Umur)	LBB (Lelang Baru Dam Bario)	KT (Kuari Trail)
Rhacophoridae	<i>Polypedates macrotis</i>	3	1	11
Bufo	<i>Bufo juxtasper</i>	4	2	1
Ranidae	<i>Meristogenys phaeromerus</i>	0	1	0
Ranidae	<i>Meristogenys sp</i>	0	1	1
Ranidae	<i>Occidozyga laevis</i>	6	2	0
Ranidae	<i>Rana nicobariensis</i>	1	1	0
Ranidae	<i>Staurois natator</i>	2	1	0
Ranidae	<i>Rana kuhli</i>	14	12	13
Ranidae	<i>Rana palavanensis</i>	2	2	0
Ranidae	<i>Rana blythi</i>	2	5	1
Ranidae	<i>Rana picturata</i>	2	20	3
Pelobatidae	<i>Leptobrachium montanum</i>	0	2	0
Pelobatidae	<i>Megophrys nasuta</i>	0	1	0
Pelobatidae	<i>Leptobrachium abbotti</i>	4	0	0
Ranidae	<i>Rana hosei</i>	0	2	0
Ranidae	<i>Rana chalconota</i>	3	0	0
Rhacophoridae	<i>Rhacophorus bimaculatus</i>	1	3	0
Microhylidae	<i>Kalophrynus pleurostigma</i>	3	0	0

BRIEF NOTE ON FROGS OF BARIO

1. Family Pelobatidae (Horned Toad and Leaf Toad Family)

- 1.1 *Leptobrachium montanum* (Large-Eyed Litter Frog), A forest floor frog which was collected amongst leaf litter in secondary forest (Lubang Garam Pa' Umur).
- 1.2 *Leptobrachium abbotti*, The specimen was found on vegetation one meter above ground at Lubang Garam Pa' Umur.
- 1.3 *Megophrys nasuta* (Borneon Horned Frog), This specimen was found on the forest floor at Lelang Baru Dam.

2. Family Bufonidae (Common Toad Family)

- 2.1 *Bufo juxtasper* (Giant River Toad) - The specimens were collected along the trail of

forest night transects. This species is also found along rocky streams (Lelang Baru Dam).

3. Family Ranidae (Tine Frogs Family)

- 3.1 *Rana kuhli* (kuhl's Creek Frog) - Most specimens were found on the banks of small streams at Lelang Baru Dam and Kuari trail. However, in Lubang Garam Pa' Umur, this species was abundant in water of small ponds along the forest trail.
- 3.2.1 *Rana picturata* - This species was first identified as *Rana signata*. They are closely related species and very similar in terms of morphology. The continuous line from the tip of the snout back along the outer edge of the eyelid in *Rana signata*, is absent in *Rana picturata* (Inger, pers. comm.). In Bario, no *Rana signata* was found in both localities. *Rana picturata*, on the other hand, was found perching on low vegetation, logs and irregularities of the stream banks in Lelang Baru Dam
- 3.3 *Meristogenys* sp - The species was formerly known as *Amolops* sp. Frogs were found both in primary forest (Lelang Baru Dam) and disturbed forest (Kuari trail), perching on rocks and low vegetation.
- 3.4 *Meristogenys phaeomerus* - The specimen was found at Lelang Baru Dam perching on low vegetation.
- 3.5 *Occidozyga laevis* (Yellow-Bellied Puddle Frog) - This species was abundant in muddy wallows at Lubang Garam Pa' Umur. The individuals were also found in muddy puddles along the forest trail at both localities. None was found along Kuari trail.
- 3.6 *Rana nicobariensis* - A widely distributed frog of disturbed habitats (Inger and Stuebing, 1989) was found in muddy wallows at Lubang Garam Pa' Umur.
- 3.7 *Staurois natator* - This frog was found perching on rocks along the streams at Lelang Baru Dam.
- 3.8 *Rana palavanensis* - The specimens were caught at both localities along the forest trail, under dead leaves.
- 3.9 *Rana blythi* - The specimens were found at both localities, living along the streams banks. However, this widely distributed frog was not abundant here compared to *Rana kuhli* and *Rana picturata*.
- 3.10 *Rana chalconota* - The specimens were found as calling groups near the base camp at Lubang Garam Pa' Umur.
- 3.11 *Rana hosei* - This frog was caught perching on vegetation along the river bank at Lelang Baru Dam.

4. Family Rhacophoridae

- 4.1 *Polypedates macrotis* - The specimens were found abundant along the kuari trail, resting on leaves of trees near the ditches.
- 4.2 *Rhacophorus bimaculatus* - This frog was collected on forest floor at Lubang Garam Pa' Umur.

5. Family Microhylidae

- 5.1 *Kalophrynus pleurostigma* - This sticky frog was found along the trail to Lubang Garam Pa' Umur, resting on dead logs.

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