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Herpetofauna of the Western Region of Endau-Rompin, Johore, Peninsular Malaysia

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ABSTRACT Thirty-three amphibian and 34 reptile species were recorded from the western region of Endau-Rompin. Of the amphibians, 32 were anurans and one caecilian; and of the reptiles 25 were lizards, 8 snakes and one turtle.

ABSTRAK Tiga puluh tiga spesies amfibia dan 34 spesies reptilia direkodkan dari wilayah barat Endau-Rompin. Daripada jumlah amfibia ini, 32 adalah spesies anura dan satu spesies caecilia, manakala daripada reptilia pula, 25 adalah spesies cicak, 8 spesies ular dan satu spesies kura-kura.

(amphibians, reptiles, checklist, Endau-Rompin, Johore)

INTRODUCTION

The western region of Endau-Rompin is a virgin tropical rain forest, mainly lowland mixed dipterocarp forest except Gunung Tiong, an edaphic hill forest. Within the lowland mixed dipterocarp forest there are riparian forests - consisting of plant communities adapted to river and stream edges and sandy or rocky banks, and small pockets of swamp forest near the streams. In terms of geological aspect this area consists mainly of volcanic rock (rhyolite is abundant along Sg. Selai and Gunung Tiong), plutonic rock, sedimentary rock and alluvial deposit.

Observations and collections of amphibians and reptiles were made around the Lubok Tapah Base Camp (02° 26' 04"N, 103° 15' 47"E), Lubok Merekek (02° 25' 56"N, 103° 15' 43"E), Takah Tinggi Waterfall (02° 26' 57"N, 103° 14' 07E), Sg. Selor (02° 26' 39"N, 103° 14' 35"E), and Gunung Tiong sub-camp (02° 25' 39"N, 103° 17' 43") during four visits (7th – 10th April 2002, 3rd - 6th May 2002, 17th – 20th May 2002 and 23rd - 30th July 2002) to these areas under the Second Scientific Expedition to Endau-Rompin, Johore. The main purpose of this survey was to document the herpetofaunal diversity of the western region of Endau-Rompin. This area had not been visited by herpetologists and there were no collections or information available for these particular areas.

MATERIALS AND METHODS

The sampling method for amphibians in all areas investigated consisted of opportunistic visual and acoustical monitoring. For reptiles survey was by opportunistic visual monitoring only. The survey was carried out by wading through the streams and strolling along the trails nearby the stream (< 20 meters from the stream). It was done at night with the aid of torchlight or headlamp, preferably after rain when possible. Some of the reptiles and a few frogs were encountered during the day. Records were also obtained through personal communications with Orang Asli (Jakun tribe), mainly for reptiles *viz.* snakes and turtles.

Scientific nomenclature largely follows [1] and [2] for amphibians, [3] and [4] for lizards, [5] and [6] for snakes and [7] for turtles.

RESULTS AND DISCUSSION

A total of 32 species of anurans, 1 species of caecilian, 25 species of lizards, 8 species of snakes and 1 species of chelonian was recorded from collections or observations from sightings and calls in the field and personal communications with Orang Asli (see the annotated checklist). For comprehensive and extensive survey, standard methods, for example quardrat sampling [8], transect and patch samplings [9], need to be applied in order to

obtain qualitative and quantitative data and so forth. Applying these methods will enhance the ecological understanding towards the herpetofaunal diversity in this area. The number of herpetofauna species in some selected locations in Peninsular Malaysia is shown in (Table 1).

The frogs and lizards found in the western region of Endau-Rompin accounted for 32% and 27% respectively of their total number of species in Peninsular Malaysia. The number of anuran and lizard species found was slightly higher during the four visits of the Scientific Expedition to the western region of Endau-Rompin, Johore, compared to that found by [10] in Ulu Endau and [14] in Belum Forest Reserve (Table 1). This may be due to the area being undisturbed by any developments *viz.* ecotourism and logging activities.

Other herpetofauna such as snakes and turtles were rather poor in terms of number of species and individuals, only 6% of snakes and 4% of turtles compared to the total for Peninsular Malaysia. This was because most of the surveys concentrated on amphibians and lizards only. Most of the snakes were opportunistically found along the trail and a newly built road from Kg. Sg. Selai to Lubok Tapah Base Camp, and the trail heading to Sg. Selor and Takah Tinggi Waterfall.

Although the western region of Endau-Rompin is a pristine virgin tropical rain forest, several amphibians normally found in human-made environment, e.g. *Bufo melanosticus, Rana limnocharis* (Plate 1I) and *Kaluola pulchra*, were found in a small drain at Lubok Tapah Base Camp and by the roadside of the newly built road. The three frogs are indicator species of man-changed habitats [15] and very rarely found in the undisturbed forest [13]. *Rana signata, Staurois larutensis* (Plate 1G), *Rana hosii* (Plate 1A), *Rana laticeps* and *Rana chalconota* (Plate 1D) were commonly found and spotted at the western region of Endau-Rompin. All these species are indicators of an untouched natural habitat. For instance, when the low-shrubs and vegetation along a stream-bank ($\approx$ 20 meters stretch) were cleared to beautify the landscape in front of the Lubok Tapah Base Camp, hardly any of these frogs were present, compared to previous visit when the stream-bank was still in a natural state and they only could be found and spotted farther from camp site. This shows that most of the anurans are vulnerable to anthropogenic activities. Loss of their requisite habitat is synonymous with the demise of the species [16].

On the other hand, it is clear that forest disturbances (e.g. tree felling exposing wide and long stretches of newly-built road and its surrounding to the base camp) assist heliothermic reptiles *viz. Mabuya multifasciata* (Plate 1J), *Mabuya longicaudata* and *Mabuya macularia* in providing suitable basking sites and allowing them greater foraging potential, but amphibians which are prey species may experience difficulties finding suitably moist habitats in this particular area.

The overall herpetofaunal diversity of the western region of Endau-Rompin, Johore is very low, 10% lower compared to [11, 12] for the Temenggor Forest Reserve and 5% lower compared to [13] for the Tioman Island (Table 1). This is probably due to only four areas were covered during the survey. There is a need to do comprehensive and extensive survey in this western region of Endau-Rompin, Johore, in order to get a complete picture of the herpetofaunal diversity *viz.* biological and ecological aspects. We hope that in future continous studies will be conducted to determine the causes of fluctuation of herpetofauna population in this pristine tropical rain forest.

Table 1. Number of herpetofauna species at some selected locations in Peninsular Malaysia

Location	Number of species	Reference
Western Region of Endau-Rompin, Johore	67	present study
Ulu Endau, Johore	54	[10]
Temenggor Forest Reserve, Perak	79	[11, 12]
Tioman Island, Pahang	70	[13]
Belum Forest Reserve, Perak	26	[14]

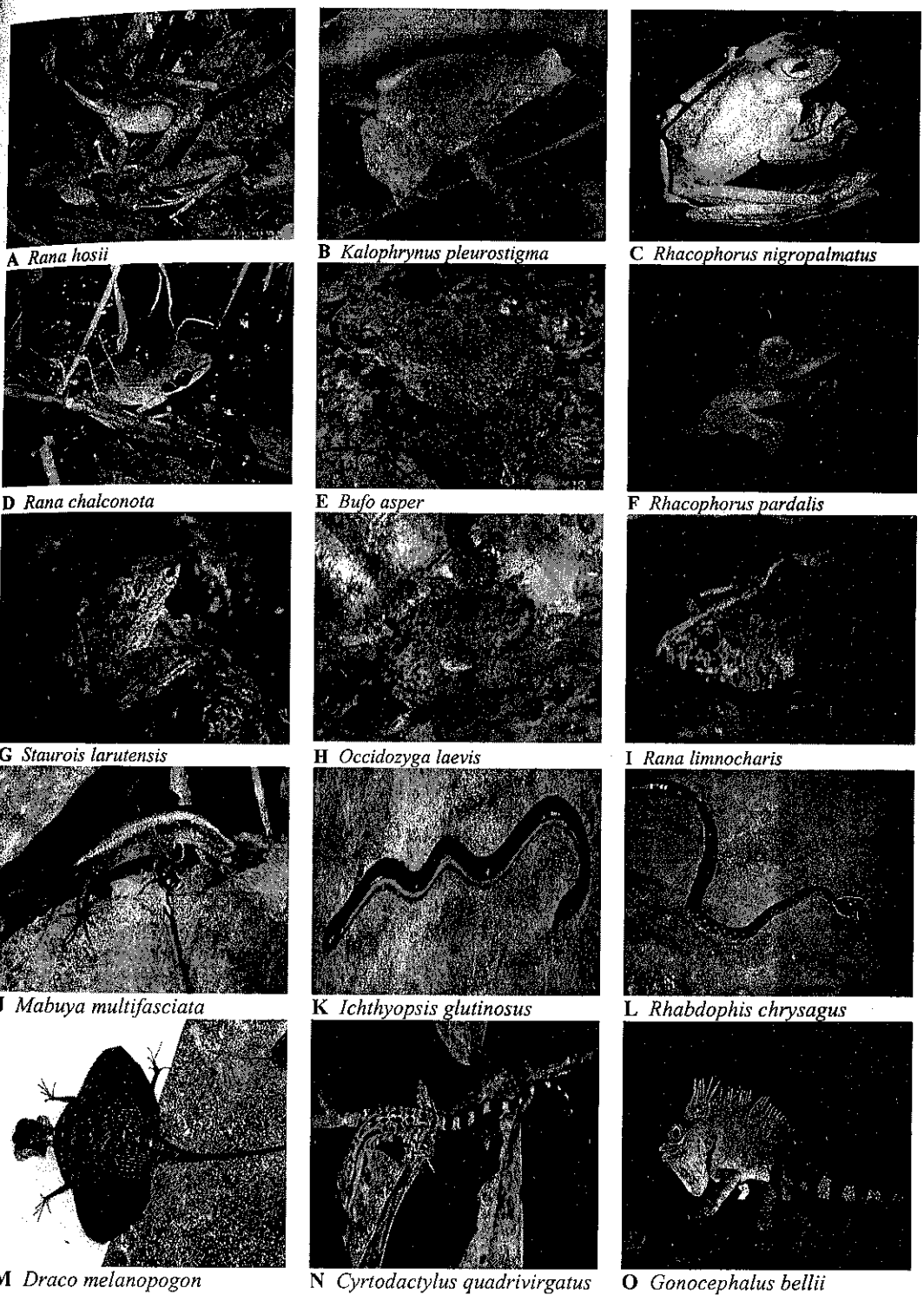

Plate 1. Several herpetofauna found at Lubok Tapah, Sg. Selai, Endau-Rompin Johore

ANNOTATED CHECKLIST

Class : **AMPHIBIA**
Order : **ANURA**

Family : BUFONIDAE

Ansonia leptopus (Günther, 1872)
Only two individuals were collected on rock near stream edge at Sg. Selor.

***Bufo asper* Gravenhorst, 1829**
More than 10 indivuals were collected from the edge of stream and river near Lubok Tapah Base Camp,Takah Tinggi Waterfall, Sg. Selor and Lubok Merekek.

***Bufo parvus* Boulenger, 1887**
One individual was collected from the forest floor along the trail between Lubok Tapah Base Camp to Sg. Selor.

***Bufo melanosticus* Schneider, 1799**
This toad normally found in human made environment, was found under the sink near the kitchen area at the Lubok Tapah Base Camp.

***Pelophryne brevipes* (Peters, 1867)**
This tiny toad was found resting on the leaf of a small shrub near the trail to Takah Tinggi.

***Pelophryne signata* (Barbour, 1938)**
It was found on top of dead leaves on forest floor in front of the chalets at the Lubok Tapah Base Camp.

Family : MEGOPHRYIDAE

***Megophrys nasuta* (Schegel, 1858)**
The body coloration was almost the same as its surrounding, hence difficult to find, only with the vocalization that it was located. It was found on the dead leaves at the forest floor nearby the Lubok Tapah Base Camp.

Family : MICROHYLIDAE

***Chaperina fusca* Mocquard, 1892**
Found near small temporary water bodies on the forest floor near Lubok Merekek.

***Kalophrynus palmatissimus* Kiew, 1984**
This sticky frog was found on the wet leaf litter at roadside between Lubok Tapah and Lubok Merekek during the night strolling along the road looking for stick-insects. According to [17], when handled roughly the frog will often secrete a sticky substance which adheres strongly to the hand.

***Kalophrynus pleurostigma* (Gravenhorst, 1838)**
Two individuals were found on the leaf litter at the Lubok Tapah Base Camp and one at the newly built roadside, < 20 meters from the base camp.

***Kaloula pulchra* Gray, 1831**
Normally found at human-made habitat, coming out after rain and making noise. The specimens were collected in a small drain near the chalets and dining hall at Lubok Tapah Base Camp.

***Kaloula baleata* (Müller, 1836)**
One individual was found in shallow water body near the newly built road in front of Lubok Merekek.

***Metaphrynella pollicaris* (Boulenger, 1890)**
It was found on the way back from Gunung Tiong Expedition in a tree hole of fallen tree which contained water.

***Microhyla annectens* Boulenger, 1900**
This frog was found 20 meters away from down stream to the Lubok Tapah Base Camp on the leaf litter near stream edge.

***Microhyla berdmorei* (Blyth, 1856)**
It was found on damp leaf litter near Lubok Merekek.

***Microhyla heymonsi* Vogt, 1911**
It was found at bushes/small shrubs near the newly built roadside, just before reaching Lubok Merekek.

***Microhyla ornata* (Duméril & Bibron, 1841)**
It was collected under damp dead leaves near stream edge of Lubok Tapah Base Camp.

Family : RANIDAE

***Lemnonectes blythi* (Boulenger, 1920)**
It was collected by Orang Asli at shaded area in Sg. Selor and down stream of Lubok Merekek.

***Lemnonectes malesiana* Kiew, 1984**
Individual was found at the patch of swampy area near the trail just before reaching Sg. Selor. According to [18] it is generally found associated

with small streams less than 2 metres wide and seepage areas.

***Occidozyga laevis* (Günther, 1858)**
One specimen found in muddy water body on the newly built road to Lubok Tapah (just after the junction to Lubok Merekek).

***Rana cancrivora* Gravenhorst, 1829**
This frog was found inside the tree bark crevice blanketed by mosses near the kitchen and dining hall at the Lubok Tapah Base Camp.

***Rana chalconota* (Schegel, 1837)**
More than four individuals were found on the vegetation near the stream edge at Lubok Tapah, Takah Tinggi Waterfall, Sg. Selor and Lubok Merekek.

***Rana hosii* Boulenger, 1891**
Most of the times this species was found sitting on the rock or low-vegetation near fast-flowing streams at Lubok Tapah and Sg. Selor.

***Rana laticeps* Boulenger, 1882**
More than 20 individuals were found at one place, hiding under the rocks in rocky streams, < 10 meters in front of Gunong Tiong sub-camp.

***Rana signata* (Günther, 1872)**
At first glance, it looked similar to *Rana picturata*. All the individuals were found on low-vegetation or dead branches near streams in Lubok Tapah, Sg. Selor, Lubok Merekek and Takah Tinggi Waterfall.

***Rana glandulosa* Boulenger, 1882**
Specimen was collected on swampy area at the back of washing room. The individual was traced by following the call 'WAHK! WAHK!'

***Rana limnocharis* Boie, 1835**
Individual was found under the exposed roots at the newly built roadside near the Lubok Tapah Base Camp.

***Staurois larutensis* (Boulenger, 1899)**
More than 40 individuals were collected one night at fast-flowing rocky stream in front of Lubok Tapah. A few of them were collected on the wet boulder and rocks at Takah Tinggi Waterfall, Sg. Selor and Lubok Merekek during the day time.

Family : RHACOPHORIDAE

***Polypedates leucomystax* (Gravenhorst, 1829)**
Two individuals were observed sitting on the leaves of vegetation at the newly built roadside to Lubok Tapah Base Camp. On other occasions, one mating pair was found on a ginger plant at the roadside of old trail.

***Polypedates macrotis* (Boulenger, 1894)**
It was found sitting on the leaf of low-vegetation near the temporary water body by the roadside to Lubok Tapah.

***Rhacophorus nigropalmatus* Boulenger, 1895**
Two individuals (male and female) were found after rain, sitting on the leaves of low-vegetation (< 30 centimeters height) from water body with fertilised eggs, < 50 meters away from Lubok Tapah Base Camp.

***Rhacophorus pardalis* Günther, 1858**
The individual was found after heavy rain, perching at one of the dining hall poles.

Class : AMPHIBIA
Order : GYMNOPHIONA

Family : ICHTHYOPHIIDAE

***Ichthyopsis glutinosus* (Linnaeus, 1758)**
One individual was slithering slowly towards the front of the dining hall at Lubok Tapah Base Camp. This was due to flooding of the area with rotten logs and branches.

Class : REPTILIA
Order : SQUAMATA

Family : AGAMIDAE

***Aphaniotis fusca* (Peters, 1864)**
The lizard was found sitting on palm leaves and small twigs. Three individuals were spotted during the night along the newly built road, ≈20-50 meters away from Lubok Tapah Base Camp.

***Bronchocela cristatella* (Kuhl, 1820)**
This Green-crested lizard was found at the dense shrubs by the roadside, not far from Lubok Merekek. It displayed light brown colour when under stress (just after the individual was caught).

***Calotes versicolor* (Daudin, 1802)**
The individual at the old trail to Sg. Selor displayed its colour of breeding season i.e. a reddish head and black blotch on the throat, probably a male and this behaviour was diplayed to attract the female counterpart.

***Draco blanfordii* Boulenger, 1885**
It was spotted gliding a few times from one tree to another at Lubok Tapah and Lubok Merekek. It was easily recognised by its uniform olive-grey colour with fine longitudinal light lines on the patagium.

***Draco fimbricatus* Kuhl, 1820**
The individual was spotted at the tree trunk a few meters near the trail down to Takah Tinggi Waterfall.

***Draco melanopogon* Boulenger,1887**
The most common Gliding lizard that was spotted on *Eugenia* sp., *Shorea* sp. and *Artocarpus* sp. tree trunk at Lubok Tapah Base Camp and Lubok Merekek. One male was trapped in mist net near Sg. Selor. It was recognised with small yellow-spots on the upper patagium.

***Draco obscurus* Boulenger, 1900**
This species was observed on the tree trunk by newly built roadside, just before reaching Lubok Tapah Base Camp.

***Draco volans* Schegel, 1844**
Another species of gliding lizard that was spotted on the tree trunk at the Lubok Tapah Base Camp, the trail to Sg. Selor and Takah Tinggi.

***Gonocephalus bellii* (Duméril & Bibron, 1837)**
Two individuals were trapped in mist net not far from Lubok Merekek.

***Gonocephalus grandis* (Gray, 1845)**
This agamid lizard was found resting on the twig near to stream edge down of Lubok Tapah.

***Gonocephalus liogaster* (Günther, 1872)**
Individual was collected from mist net < 20 meters away from the parking place at Lubok Tapah Base Camp.

Family : GEKKONIDAE

***Cyrtodactylus consobrinus* (Peters, 1871)**
The adult was seen on tree buttress at trail to Sg.Selor and photographed. It was another colour variation of adult for this species.

***Cyrtodactylus pulchellus* Gray, 1828**
Found resting on tree trunk covered by mosses at Lubok Tapah Base Camp.

***Cyrtodactylus quadrivirgatus* Taylor, 1962**
It was spotted sitting on the twig of small tree near the newly built road (< 50 meters away from Lubok Tapah).

***Cyrtodactylus sworderi* (Smith, 1925)**
The individual collected by Orang Asli on dead tree buttress nearby the newly built roadside heading towards the Lubok Tapah Base Camp.

***Gekko gekko* (Linnaeus, 1768)**
The individual was spotted foraging at night on the palm tree at the roadside near Lubok Merekek.

***Gekko monarchus* (Duméril & Bibron, 1836)**
Commonly found in chalets and dining hall at Lubok Tapah Base Camp. A few of this lizard were found on the tree buttresses at night time.

***Gekko smithii* Gray, 1842**
It was spotted resting on the leaf of vegetation during the night strolling along the newly built road heading towards the Lubok Tapah Base Camp.

Family : SCINCIDAE

***Mabuya longicaudata* (Hallowell, 1857)**
One individual was spotted resting on the dead log and basking under the sun in front of the temporary *surau* at Lubok Tapah Base Camp.

***Mabuya macularia* (Blyth, 1853)**
The individual was spotted foraging for insects in low shrubs at the newly built roadside.

***Mabuya rugifera* (Stoliczka, 1870)**
This species was spotted under the low shrub near the stream during the day time in front of dining hall at Lubok Tapah Base Camp.

...*multifasciata* **(Kuhl, 1820)**
... all of them were spotted foraging for ... on the forest floor at Lubok Tapah Base ... They normally came out from their hiding ... such as under rotted logs and dead leaves ... sunrise. One individual was spotted preying ... grasshopper in front of dining hall at ... Tapah Base Camp.

...mily : **VARANIDAE**

...*anus nebulosus* **(Gray, 1831)**
... individual was spotted climbing a strangling ... tree at nearby trail to Sg Selor and Takah ... Tinggi.

Varanus rudicollis **(Gray, 1845)**
Spotted resting on a log close to the stream, a few meters away from Takah Tinggi Waterfall.

Varanus salvator **(Laurenti, 1786)**
It was spotted foraging at the water's edge near where the bird group was setting the mist nets, just across Lubok Tapah Base Camp. On one occasion it was spotted trying to eat bird that was caught in the mist net.

Class : REPTILIA
Order : SQUAMATA

Family : BOIDAE

Python reticulatus **(Schneider,1801)**
The Orang Asli collected quite a number of this snake from the old trail to Lubok Tapah, trail to Sg. Selor,Takah Tinggi and sold them to the reptiles'shop at Bekok Town.

Family : COLUBRIDAE

Ahaetulla prasina **(Boie, 1827)**
The snake was spotted entwined to twigs of *Macaranga* sp. near roadside of old trail to Lubok Tapah Base camp during the night time.

Macropisthodon rhodomelas **(Boie, 1827)**
The juvenile was spotted in front of the temporary *surau* at the Lubok Tapah Base Camp.

Rhabdophis chrysargus **(Schegel, 1837)**
The juvenile was spotted crossing the muddy areas of newly built road, just after a junction to Lubok Merekek.

Dendrelaphis formosus **(Boie, 1827)**
The individual was spotted at the tree buttress and picture was taken by Prof. Mohd. Sofian Azirun at Lubok Merekek.

Family : ELAPIDAE

Bungarus flaviceps **Reinhardt, 1843**
It was spotted crossing the trail and moving slowly towards a small soil crevice nearby the trail to Takah Tinggi.

Family : TYPHLOPIDAE

Typhlops diardi **(Schegel, 1839)**
One dead specimen of Diard's Blind snake was found by Orang Asli under the leaf litter; at first sight looking a worm but with a very contrasting coloration, being dark (grey) above and light (white) below.

Family : CROTALIDAE

Tropidolaemus wagleri **Wagler, 1830**
The juvenile was spotted entwined to twigs of small tress at the day time, during checking of mist nets near Lubuk Merekek area.

Class : REPTILIA
Order : TESTUDINES

Family : BATAGURIDAE

Heosemys grandis **(Gray, 1860)**
Altogether seven individuals (all of them juvenile) were caught by Orang Asli along the Sg. Selai, from Lubok Merekek to Takah Tinggi and Sg. Selor (tributary of Sg. Selai).

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