

**A Field Guide to the**



# **Frogs of the Lower Kinabatangan**

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## ***About the Guide***

**This guide is aimed to introduce you to the diverse, colourful and sometimes bizarre-looking frogs and toads of the Lower Kinabatangan Floodplain, Sabah, Borneo. So far, 33 species of frog are now known from this region, but the number continues to grow.**

**Information for this guide has been compiled from Inger and Stuebing (A Field Guide to the Frogs of Borneo, 2005 Edition), the Frogs of Borneo website ([www.frogsofborneo.com](http://www.frogsofborneo.com)) and from our own field observations in the Lower Kinabatangan.**

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**Or taken directly from:**

**[www.frogsofborneo.com](http://www.frogsofborneo.com)**

**[www.wildlifeimages.com.au](http://www.wildlifeimages.com.au)**

**[www.frogweb.org](http://www.frogweb.org)**

**[www.wildborneo.com.my](http://www.wildborneo.com.my)**



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## Family Rhacophoridae

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# Key to the Frogs of the Lower Kinabatangan

4

1. Conspicuous webbing on hand, at least between two outer fingers.....2  
No webbing between outer fingers.....6
2. Webbing red.....3  
Webbing not red.....4
3. Forearm with flap of skin along outer edge.....*Rhacophorus pardalis*  
Forearm with no flap of skin.....*Rhacophorus rufipes*
4. Outer leg with a wavy-edge fringe of skin...*Rhacophorus appendiculatus*<sup>1</sup>  
Outer edge of leg otherwise.....5
5. Translucent jade coloured skin.....*Rhacophorus dilutensis*  
Skin not as above.....6
6. Snout sharply pointed, with conspicuous sharp ridge between eye and nostril.....*Rhacophorus harrissoni*  
Snout otherwise.....7
7. A large conspicuous 'wart' or gland (parotoid gland) behind the eye in shoulder area, as large or larger than then eye.....8  
No large gland behind the eye.....9
8. Parotoid gland oval or triangular.....*Ingerophrynus divergens*  
Parotoid gland not as above.....9
9. Eardrum visible.....14  
Eardrum not visible.....10
10. Underside of foot with a prominent ridge/flange at the base of the foot ....  
.....*Kaloula baleata*  
Underside of foot not as above.....11
11. First finger missing..... *Microhyla perpava*  
First finger not missing.....12

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1). Note: the webbing between the fingers in *R. appendiculatus* is not conspicuous;  
there is often only a very small amount, usually dark brown in colour.

|                                                                                                           |                                           |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 12. The outer three toes are half webbed.....                                                             | <i>Microhyla borneensis</i>               |
| Webbing otherwise.....                                                                                    | 13                                        |
| 13. Chest and abdomen whitish, without spots.....                                                         | <i>Occidozyga laevis</i>                  |
| Chest and abdomen with many dark spots.....                                                               | <i>Occidozyga baluensis</i>               |
| 14. Black spot(s) present on side of the body in front of hind leg.....                                   |                                           |
| .....                                                                                                     | <i>Kalophrynus pleurostigma</i>           |
| Colouration otherwise.....                                                                                | 15                                        |
| 15. Back cinnamon-coloured or red, speckled with white; a white spot on the upper eyelid.....             | <i>Nyctixalus pictus</i>                  |
| Colouration not as above.....                                                                             | 16                                        |
| 16. Underside of fingers with enlarged pads, broader than the finger tips; tree hole frog.....            | <i>Metaphrynella sundana</i> <sup>2</sup> |
| Fingers with no such pads.....                                                                            | 17                                        |
| 17. Belly golden yellow with black network.....                                                           | <i>Chaperina fusca</i>                    |
| Belly not as above.....                                                                                   | 18                                        |
| 18. Body green with a light yellowish stripe down each side of the back.....                              |                                           |
| .....                                                                                                     | <i>Hylarana erythraea</i>                 |
| Colouration otherwise.....                                                                                | 19                                        |
| 19. Body green, usually without spots; upper lip white.....                                               | <i>Hylarana raniceps</i>                  |
| Body usually not green, lip not white.....                                                                | 20                                        |
| 20. Fourth toe (the longest) fully webbed to base of tip.....                                             | 21                                        |
| Fourth toe with at least two joints free of full web.....                                                 | 22                                        |
| 21. A dark stripe between eye and nostril on side of snout; top and side of snout form a sharp angle..... | <i>Limnonectes leporinus</i>              |
| No dark stripe on side of snout; a rounded surface formed by top and side of snout.....                   | <i>Limnonectes ingeri</i>                 |
| 22. An inverted V-shaped ridge on back between the shoulders.....                                         |                                           |
| .....                                                                                                     | <i>Limnonectes finchi</i> <sup>3</sup>    |

2) It is often very difficult to see the eardrum of *M. sundana*

3) This V-shaped ridge is often very difficult to distinguish

|                                                                                                                                           |                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| No such ridge.....                                                                                                                        | 23                              |
| 23. Tips of toes widened into rounded pads or discs.....                                                                                  | 27                              |
| Tips of toes not widened into distinct pads.....                                                                                          | 24                              |
| 24. A series of short ridges on the back.....                                                                                             | 25                              |
| A few rounded rough areas or back smooth.....                                                                                             | 26                              |
| 25. Three joints of the fourth toe (the longest) with no webbing, frequently<br>with a light stripe down the back.....                    | <i>Fejervarya limnocharis</i>   |
| Only one or two joints of fourth toe without webbing, no stripe.....                                                                      | <i>Fejervarya cancrivora</i>    |
| 26. Usually a dark streak from eye to nostril on side of snout; usually entire<br>eardrum covered by large dark marking; head narrow..... | <i>Limnonectes paramacrodon</i> |
| No dark streak from eye to nostril; usually about half of eardrum covered<br>by dark pigment; head wide.....                              | <i>Limnonectes malesianus</i>   |
| 27. Head narrow, snout long, distance between the eye and nostril longer<br>than eye diameter.....                                        | <i>Hylarana nicobariensis</i>   |
| Head wider, snout shorter, diameter of eye longer than distance between<br>the eye and nostril.....                                       | 28                              |
| 28. A conspicuous saw-edged bony ridge above the eardrum.....                                                                             | <i>Polypedates otitophus</i>    |
| No such ridge.....                                                                                                                        | 29                              |
| 29. Eardrum covered by dark band extending along shoulder to<br>armpit.....                                                               | <i>Polypedates macrotis</i>     |
| Pattern otherwise.....                                                                                                                    | 30                              |
| 30. Sides with enlarged skin glands, producing a rough or pebbled surface....                                                             | <i>Hylarana glandulosa</i>      |
| Sides of skin not as above.....                                                                                                           | 31                              |
| 31. Snout sharply pointed.....                                                                                                            | <i>Polypedates colletti</i>     |
| Snout not pointed.....                                                                                                                    | <i>Polypedates leucomystax</i>  |

## ***Ingerophrynus divergens***

### Crested Toad



#### **Description:**

- The only toad currently known from the LK.
- Small and stocky, with numerous spiny, keratinized warts.
- The snout is narrow and projects beyond the mouth and there are raised crests between the eyes.
- The eardrum is visible.
- None of the toes are fully webbed.
- The general colour is mottled clay to reddish brown, often with dark chevron markings on the back.
- Many individuals possess a thin, white stripe running down the back.
- Skin secretions from this species are toxic, always wash your hands after handling it!

**Size:** Males: 28-43 mm, Females: 36-55 mm

#### **Habitat and Behaviour:**

- Found within the forest floor leaf litter.
- Adults breed in small, shallow streams or in pools where males usually form noisy calling groups.

**Call:** A querulous, raspy, rising trill.

## ***Fejervarya cancrivora***

### Mangrove Frog



#### **Description:**

- A medium to large frog, with a long snout and muscular hind limbs.
- The back and sides have raised bumps and ridges.
- The eardrum is conspicuous.
- The toes are more than half-webbed, but the tips are free from webbing and are not swollen.
- The general colour is mottled brown to grey on the back and legs.
- Across the top of the legs there are several dark markings and there is a dark bar across the top of the head, between the eyes.
- The underside of the head varies from pure white to white with dark mottling.

**Size:** Males: 51-70 mm, Females: 53-82 mm

#### **Habitat and Behaviour:**

- Found commonly within disturbed habitats, including oil palm plantations; but also found within mangroves and riparian habitats.

**Call:** A, raspy call, repeated several times, sometimes described as a “dododododok ...dododok” sound.

# *Fejervarya limnocharis*

## Grass Frog



### Description:

- A small frog, with a narrow head and an oval shaped body.
- The skin is covered with a series of ridges down the back and sides
- The eardrum is conspicuous and is positioned under a prominent fold of skin which runs from the back of the eye.
- Toes are less than half webbed and pointed, fingers are also pointed.
- The general colour is rusty brown to brownish grey, with dark blotches along the back; the underside is light grey-cream colour.
- There is usually a distinctive U- or W- shaped marking across the shoulders.
- Most individuals (but not all) have a thick light stripe across the back.

**Size:** Males: 32-50 mm, Females: 49-58 mm

### Habitat and Behaviour:

- Found commonly within disturbed habitats, including oil palm plantations, forest edges and open clearings.
- Groups of males usually gather in large groups around standing water and chorus.

**Call:** A raspy chirp, which is rapidly repeating.

***Limnonectes finchi***  
Rough Guardian Frog



**Description:**

- A small, quite stocky frog with long hind limbs and thick thighs.
- The back had a V-shaped ridge in the middle, with several short ridges and bumps running down the sides.
- The eardrum is visible.
- Toes are partially webbed and lightly swollen at the tips.
- The colour is brown to dark brown often with dark markings along the arms and legs. The underside is white, often with a yellowish tinge.
- There is a dark bar across the top of the eyes, and the chin and throat are darkly mottled.
- Note: some individuals have been found with a light stripe running down the back, do not confuse with *F. limnocharis*.

**Size:** Males: 32-39 mm, Females: 39-45 mm

**Habitat and Behaviour:**

- Lives on the forest floor on most forest types, has also been found within edge habitats and on occasions within oil palm plantations.

**Call:** A short trill.

***Limnonectes ingeri***  
Greater Swamp Frog



**Description:**

- A large, heavy-bodied frog with a broad head and muscular limbs.
- The skin is normally smooth, but there may be some scattered bumps and short ridges small bumps.
- The eardrum is distinct.
- Toes are fully webbed and the tips are slightly swollen.
- The colour is generally reddish brown, but some frogs can be chocolate brown in colour.
- Some individuals have been found with a thin, light stripe running down the back.
- Do not confuse with *L. leporinus*; there is no dark stripe running from the eye to the nostril.

**Size:** Males: 75-132 mm, Females: 70-127 mm

**Habitat and Behaviour:**

- Lives on the forest floor on most forest types, has also been found within edge habitats and on occasions within oil palm plantations.

**Call:** Males have no vocal sacs and are not known to call.

***Limnonectes leporinus***  
Giant River Frog



**Description:**

- A large frog with a long tapered snout and muscular hind limbs. The top and sides of the snout meet at a sharp angle.
- The back is often covered in short ridges and bumps.
- The eardrum is distinct.
- The toes are fully webbed and slightly swollen at the tips.
- The colour varies from reddish brown to brown with dark markings.
- The underside is white with grey mottling.
- There is always a characteristic dark streak on the side of the snout between the eye and the nostril.
- There is often a W-shaped mark between the shoulders.

**Size:** Males: 90-175 mm, Females: 85-125 mm

**Habitat and Behaviour:**

- This species is not as common as *L. ingeri* in the LK, but has been observed upriver and in oil palm plantations.

**Call:** Unknown.

## ***Limnonectes malesianus***

### Peat Swamp Frog



#### **Description:**

- A large, stout frog with a broad head and thick, muscular limbs.
- The skin is smooth, with some low bumps on the back and sides.
- The eardrum is distinct.
- The toes are three-fourths webbed and slightly swollen at the tips.
- The colour is usually reddish brown but some individuals can be a dark chocolate brown.
- There are usually wide black bars which run across the lips.
- Most individuals have a fine, white line which runs from the snout down the back, similar lines are often seen running down the legs.
- The throat and chest have dark mottling, whilst the underside of the of the thighs are very dark.
- Males have long fang-like structures on the lower jaw.

**Size:** Males: 70-150 mm, Females: 75-95 mm

#### **Habitat and Behaviour:**

- It appears uncommon in the LK and has, so far, only been found at one forest stream site.

**Call:** Unknown.

## ***Limnonectes paramacrodon***

### Lesser Swamp Frog



#### **Description:**

- A medium to stocky frog, with long muscular hind limbs.
- The snout ends in a rounded point.
- The eardrum is visible.
- All toes, except the fourth (the longest) are almost fully webbed and are distinctly swollen at the tips.
- The colour is greyish to reddish brown and the upper surface is roughly pebbled with some small lumps on the back.
- The distinctive feature is a dark brown, diamond shaped spot (that almost appears as a mask) that covers the entire eardrum.
- The rear half of the belly and the underside of the legs is yellow.

**Size:** Males: 60-75 mm, Females: 55-66 mm

#### **Habitat and Behaviour:**

- This species is usually found along clay and gravel banks of streams. It has been seen in lot 5 and one individual has been observed in an oil palm plantation on the South side of the Kinabatangan .

**Call:** Unknown.

***Occidozyga baluensis***  
Seep Frog



**Description:**

- A small, stocky frog with short, hind limbs.
- The skin on the back is fairly smooth, often with some faint wrinkles and low bumps, there is also often a short ridge just behind the eyes.
- The eardrum is not visible.
- The middle of the back has a weak U-shaped ridge.
- The toes are about three-quarter webbed.
- The colouring can be variable but most individuals have a lighter tan or clay coloured head, whilst the rear of the back is dark brown.
- The limbs are usually tan with dark crossbars.
- The underside is cream with brown spots.

**Size:** Males: 15-25, Females: 25-35 mm

**Habitat and Behaviour:**

- Not as common as *O. laevis* in the LK. This species is almost always found where water seeps from a slope into a flat area. This species is very well camouflaged and almost invisible until it hops.

**Call:** A series of low-pitched raspy notes.

***Occidozyga laevis***  
Yellow-bellied Puddle Frog



**Description:**

- A small, squat frog with short, fat hind legs.
- The snout is moderately pointed.
- The eardrum is not visible.
- All toes are fully webbed and rounded at the tips.
- The colouring is usually dark grey-brown; some individuals also have a light streak running down the back.
- The underside of the head is light grey, with speckled brown spots.
- The underside of the belly and thighs is usually tinged yellow. Note: in juveniles the belly does not usually have this yellow tinge.
- Very similar to *O. baluensis*, except that the distance between the eyes is the same or narrower than the width of the eyelid.

**Size:** Males: 21-31, Females: 35-48 mm

**Habitat and Behaviour:**

- This species is found on the forest floor, often submerged in small water bodies, including muddy puddles and small streams.

**Call:** Unknown.

***Chaperina fusca***  
Saffron-bellied Frog



**Description:**

- A very small frog, with the body shape of a large almond.
- The eardrum is just visible
- The toes have no webbing
- The tips of the toes and the fingers are slightly widened.
- There is a small spine which projects from the elbow and heel.
- The colouration is greenish black on the back, whilst the underside is distinctively black with a network of bright yellow spots.

**Size:** Males: 18-21 mm, Females: 20-24 mm

**Habitat and Behaviour:**

- Found on the forest floor, primarily in the leaf litter but occasionally on low vegetation.
- Difficult to locate as they are usually buried within the leaf litter.
- Have been seen around the Danau Girang Field Centre in pitfall traps and by carefully disrupting the leaf litter during visual encounter surveying.

**Call:** A short, insect-like buzz.

# ***Kalophrynus pleurostigma*** Rufous-sided Sticky Frog



## **Description:**

- A small to medium sized, stocky frog, with a triangular head and pointed snout.
- Females have a finely pebbled upper surface, whilst males have many small spines.
- The eardrum is distinct.
- The outermost toe and finger are short, toes also have little webbing.
- The general colour varies from light to dark brown on the back and rusty oranges on the sides.
- A white line runs diagonally from the snout to the groin and there is always a conspicuous black spot in front of each hind leg.
- Some individuals have an X-shaped marking across the back.

**Size:** Males: 37-50 mm, Females: 35-57 mm

## **Habitat and Behaviour:**

- Usually found within the leaf litter.
- Has been found in various forest lots of the LK, including Lot 6.
- Exudes a sticky, glue-like mucus when handled.

**Call:** Probably a sharp repetitive chirp.

***Kaloula baleata***  
Brown Bull Frog



**Description:**

- A squat, round frog with short, thick hind limbs and a blunt snout.
- The skin is often granular, with scattered lumps.
- The eardrum is not visible
- The tips of the fingers are widened and blunt. Toes have only slight webbing and are blunt at the tips.
- The sole of the foot has a pair of flanges at the base of the toes.
- The general colour varies from chocolate to dark brown and there is often a lighter band across the head.
- There are usually bright yellow marks at the base of the front and hind limbs.

**Size:** Males: 50-61 mm, Females: 55-66 mm

**Habitat and Behaviour:**

- This frog has been shown to prefer disturbed habitats and is common on forest edges. It has also been found in oil palm plantations.
- Usually inflates when handled.

**Call:** A loud sharp, honk.

## ***Metraphrynella sundana***

### Tree Hole Frog



#### **Description:**

- A tiny, stocky frog with a pointed snout.
- The backs and top of the legs are covered in minute warts.
- The eardrum is just visible.
- The feet are fleshy and the toes are about half webbed.
- The tips of the fingers are widened and the underside has a thickened, fleshy pad at the base.
- The tops of the fingers are usually yellow.
- The colour varies from grey to light brown, some individuals have a large dark brown mark running down the back.

**Size:** Males: 19-26 mm, Females: 23-29 mm

#### **Habitat and Behaviour:**

- Males call from water-containing holes in small trees (usually between one and three metres off the ground).
- Commonly heard in the LK and around Danau Girang, but notoriously difficult to see.

**Call:** A single piping note at regular intervals. The pitch of the call can vary, depending on the dimensions of the tree hole.

## ***Microhyla borneensis***

### Bornean Narrow-mouthed Frog



#### **Description:**

- A small frog with long hind limbs. The snout is slightly pointed and projects in front of the mouth.
- The skin is smooth.
- The eardrum is not visible.
- **Four** fingers are evident. The toes have slightly widened tips and the three outer toes are about half webbed.
- The general colour varies from grey to brown. There is often a dark brown/ purple mark down the back which projects out to the side.
- The underside is generally white with brown mottling.
- Easy to confuse with *M. perpava*; *M. perpava* has three fingers and is usually smaller than *M. borneensis*.

**Size:** Males: 17-18 mm, Females: 19-26 mm

#### **Habitat and Behaviour:**

- Adults live on the forest floor within the leaf litter and breed in small pools. Several individuals have been observed in oil palm plantations.

**Call:** Probably a repeated raspy trill.

***Microhyla perpava***  
Lesser Narrow-mouthed Frog



**Description:**

- A tiny frog with long hind limbs. The snout is slightly pointed and projects in front of the mouth.
- The skin is smooth.
- The eardrum is not visible.
- Only **three** fingers are evident.
- The general colour varies from grey to brown. There is often a small dark brown mark running down the centre of the back.
- The underside of the throat is dusky brown, but the belly is completely white.

**Size:** Males: 10-12 mm, Females: 13-15 mm

**Habitat and Behaviour:**

- Adults live on the forest floor within the leaf litter and breed at rain pools within the forest floor.

**Call:** Unknown.

## ***Hylarana erythraea***

### Green Paddy Frog



#### **Description:**

- A medium sized frog with long hind limbs and a tapered snout.
- The skin is smooth, with a ridge running down each side of the back.
- The eardrum is very distinct.
- The toes are about half webbed, with the fourth (longest) toe free from webbing near the tip.
- The colour is bright to dark green and there is a yellow-white stripe running down either side of the back.
- Easy to confuse with *H. raniceps* when juveniles, look for the distinctive eardrum and stripes.

**Size:** Males: 32-45 mm, Females: 48-75 mm

#### **Habitat and Behaviour:**

- A terrestrial species, usually always found around water.
- Common in oil palm plantations and occasionally found within forest edges.

**Call:** A squeaky warble.

## ***Hylarana glandulosa***

### Rough-sided Frog



#### **Description:**

- A medium-large sized frog with a broad head and prominent eyes.
- The skin is covered in raised, round bumps that are especially prominent along the sides of the body.
- The eardrum is large and very distinct.
- The toes are about half webbed and both the tips of the toes and fingers have thickened, slightly triangular pads.
- There is a short ridge of skin which runs back from the upper eyelid and ends above the eardrum.
- The colour is generally brown with dark brown-back spots. The sides are lighter with brown blotches
- The underside is usually white with some brown spots.

**Size:** Males: 58-93 mm, Females: 65-84 mm

#### **Habitat and Behaviour:**

- A terrestrial species found abundantly in both forest habitats and oil palm plantations.

**Call:** A loud resonant sequence of 'WHAK' or 'YAP'.

## ***Hylarana nicobariensis***

### Cricket Frog



#### **Description:**

- A small-medium sized frog with a long, narrow, pointed head.
- The skin of the back is finely pebbled and there is a distinct ridge or fold of skin along each side.
- The eardrum is visible.
- The toes are about half webbed and the longest toe extends far beyond the webbing.
- Both the fingers and toes are long with slightly swollen tips.
- The colour is always brown with dark spots, the lip is pearly white, whilst the underside is dirty white with grey mottling.
- Can be mistaken for *H. raniceps*, note that *H. nicobariensis* has considerably smaller toe pads and less webbing on the toes.

**Size:** Males: 37-47 mm, Females: 47-53 mm

#### **Habitat and Behaviour:**

- A terrestrial species found abundantly in forest and oil palm plantation habitats.

**Call:** A distinctive 'kek' sound, repeated six to ten times in sharp sequence.

## ***Hylarana raniceps*** White-lipped Frog



### **Description:**

- A small-medium sized frog with a pointed head and long hind limbs.
- The skin on the back is finely pebbled and there is a slight fold of skin running down each side.
- The eardrum is distinct.
- The toes are almost fully webbed and the tips of all toes and fingers are swollen to form distinctive round disks.
- The colour of the back is usually a rich green during the day and brown at night. The sides can vary from brown to bright green.
- The upper lip is pearly white.
- The underside is usually white with occasional brown spots, in some populations the underside of the legs can be a reddish colour.

**Size:** Males: 33-34 mm, Females: 46-59 mm

### **Habitat and Behaviour:**

- A semi-arboreal species found abundantly in forest and oil palm plantation habitats. Usually found perching on shrubs and small trees.

**Call:** A staccato series of clicking notes.

## ***Nyctixalus pictus*** Cinnamon Frog



### **Description:**

- A small frog with a pointed snout and long hind limbs.
- The skin of the upper surface is rough, with many small, spiny bumps.
- The eardrum is visible and slightly smaller than the eye.
- The toes are about half webbed, but the fingers lack webbing. The tips of both the fingers and toes are expanded into round pads.
- All upper surfaces and sides are cinnamon brown in colour. Some individuals can also be red or orange.
- Small glossy white spots are scattered all over the upperside of this species which form a broken line from the eyelid to the snout.
- The upper half of the iris is also white, whilst the lower half is brown.

**Size:** Males: 30-33 mm, Females: 31-34 mm

### **Habitat and Behaviour:**

- Adults are usually found on small shrubs and trees, one to three meters off the ground. This species has been found on several occasions in the LK, including within Lot 6.

**Call:** Unknown.

## ***Polypedates colletti***

### Collett's Tree Frog



#### **Description:**

- A small (males) to large (females) tree frog with a triangular head and a sharply pointed snout.
- The skin is smooth, except for a fold over the eardrum.
- The eardrum is visible.
- The toes are about half webbed; both the toes and fingers are widened into pads at the tips.
- The colour varies from light tan to pinkish brown.
- There is usually a conspicuous mark on the back in the shape of an hour-glass or X.
- The sides have scattered brown spots, whilst the limbs have crossbars

**Size:** Males: 44-52 mm, Females: 59-77 mm

#### **Habitat and Behaviour:**

- An arboreal species which is common in the LK. Not yet recorded in Lot 6.

**Call:** A repeated honk.

# ***Polypedates leucomystax***

## Four-lined Tree Frog



### **Description:**

- A medium to large sized frog with a slender body and long hind limbs.
- The skin is smooth, except for a curved fold over the eardrum.
- The eardrum is visible.
- The toes are about three-quarter webbed, with the exception of the fourth toe which projects beyond the webbing.
- The colour varies from light beige to dark tan. Many individuals have four narrow stripes running down the back.
- Note: not all individuals have this distinguishing marking, some have scattered brown spots. Don't confuse with *P. macrotis*, always check the presence of a dark band running over the eardrum; this is conspicuous in *P. macrotis*.

**Size:** Males: 37-50 mm, Females: 57-75 mm

### **Habitat and Behaviour:**

- Commonly found in disturbed habitats such as oil palm plantations and forest edges. Usually found on low lying vegetation.

**Call:** A low-pitched nasal quack.

## ***Polypedates macrotis***

### Dark-eared Tree Frog



#### **Description:**

- A medium to large sized tree frog with large, prominent eyes and a triangular head.
- The skin is generally smooth, though some individuals may have some small bumps on the back.
- The eardrum is very distinct.
- The toes are almost fully webbed, with the exception of the fourth toe.
- The colour varies from light tan to dark brown and there is a characteristic dark brown band running over the eardrum and down the side.
- The underside of the head is mottled brown, whilst the belly is white.
- There is often a narrow, white ridge of skin running along the outer edge of the forearm.

**Size:** Males: 45-57 mm, Females: 66-85 mm

#### **Habitat and Behaviour:**

- Common in the LK, found both in forest habitats, as well as in forest edges and oil palm plantations.

**Call:** A long drawn out chuckle.

# ***Polypedates otilophus*** File-eared Tree Frog



## **Description:**

- A large tree frog with a triangular head and a protruding, sharp point at the angle of the jaw.
- There is a characteristic saw-edged ridge over the eardrum.
- The skin is smooth, except for a pointed projection on each elbow and heel.
- The eardrum is visible
- The toes are only half webbed.
- The colour varies from light tan to yellow, with thin dark lines running down the back and head.
- The underside of the thighs are marked with eight to twelve bold black bars on a white background.
- The underside is usually dirty white.

**Size:** Males: 64-80 mm, Females: 82-97 mm

## **Habitat and Behaviour:**

- Found on several occasions in the LK in forest habitats. It has also been observed in an oil palm plantation.

**Call:** A series of raspy slurs followed by several loud “chucks”.

***Rhacophorus appendiculatus***

## Frilled Tree Frog

**Description:**

- A small tree frog with a triangular head. Males have almost conical tip to the snout, whilst females have an enlarged conical projection, giving them a “boat-nosed” appearance.
- The skin of the upper surfaces are covered with many irregular small bumps.
- The outer edges of the forearms and legs have a characteristic wavy-edged fringe of skin .
- The eardrum is visible.
- The toes are about three-fourths webbed, whilst the two outer fingers are also partially webbed (this is often barely visible).
- The upper surfaces are grey green to brown and the underside is often yellowy white. Some individuals have pinkish tinge on the thigh.

**Size:** Males: 30-37 mm, Females: 42-50 mm

**Habitat and Behaviour:**

- Abundant in the LK in forest and some oil palm plantation habitats.

**Call:** The calls can vary, but are often a short to long series of soft clicking notes.

## ***Rhacophorus dilutensis***

### Jade Tree Frog



#### **Description:**

- A small tree frog with a sharply pointed snout and a slender body.
- The skin is smooth.
- The eardrum is visible
- The toes are fully webbed and the fingers are almost fully webbed. The top of the web between the outer toes is red.
- The colour is a distinctive pale jade, sometimes with brown dots.
- There is a white-edged ridge of skin along the outer edge of the forearm and lower leg. A ridge of skins also projects above the anus.
- The underside is transparent and the turquoise bones can be seen from beneath.

**Size:** Males: 33-40 mm, Females: 49-50 mm

#### **Habitat and Behaviour:**

- An arboreal species often found several metres above ground in the trees. It forms large breeding groups over standing water bodies and after heavy rain. Found in many locations within the LK; it has also been observed at the edges of oil palm plantations.

**Call:** A short, weak, cricket-like trill.

## ***Rhacophorus harrissoni***

### Brown Tree Frog



#### **Description:**

- A small-medium sized tree frog with a pointed, sharp-edged snout.
- The skin of the back is smooth, whilst the belly is finely pebbled.
- The eardrum is visible.
- The toes are fully webbed and the three outer fingers are also webbed to the pads. The webbing is usually dark brown to dark grey.
- The colour is reddish brown to clay brown. The back is plain but the limbs can often have slightly darker crossbars.
- The side of the head sometimes has white spots
- The sides and hidden surface so of the legs can appear green

**Size:** Males: 50-56 mm, Females: 60-70 mm

#### **Habitat and Behaviour:**

- Found at only a few sites in the LK. Little is known about the usual foraging height, but it is known to descend from the trees to breed.

**Call:** Unknown.

## ***Rhacophorus pardalis***

### Harlequin Tree Frog



#### **Description:**

- A small-medium sized tree frog with a rounded snout.
- The skin on the back is smooth, whilst the belly is coarsely pebbled.
- The toes and three outer fingers are fully webbed to the pads, the webbing is usually orange-red.
- The upperside is tan to reddish brown, occasionally covered in white spots. Some individuals also have a dark X shaped marking. The sides are usually yellow with dark spots. There is an orange network on the belly.
- A wide flap of skin runs along the outer edge of the forearm and hand. The heel also has a rounded flap of skin.
- It is thought that some individuals (possibly juveniles) are block yellow in colour with scattered brown spots (see top right picture).

**Size:** Males: 39-55 mm, Females: 55-71 mm

#### **Habitat and Behaviour:**

- A common tree frog found within forest and forest edges of the LK. It forms noisy breeding groups over standing water.

**Call:** A brief raspy chuckle or cackle.

***Rhacophorus rufipes***  
Red-legged Tree Frog



**Description:**

- A small tree frog with a sharply pointed snout.
- The skin is smooth on the upperside but coarsely granular on the belly
- The eardrum is visible
- The toes are fully webbed and the outer finger are also extensively webbed. The webbing is bright orange-red.
- There are no fringes or flaps of skin on the limbs
- The upper surfaces are a tan to reddish brown colour with several brown markings and crossbars.
- The underside is pale tan without the orange network seen in *R. pardalis*.

**Size:** Males: 33-39 mm, Females: 48-50 mm

**Habitat and Behaviour:**

- Little is known about this species. Only one individual has been observed in the LK in Lot 7. This individual was found approximately one metre off the ground, perched on low vegetation.

**Call:** Unknown.

***Chiromantis sp. nov***

**A recently discovered frog, which appears to be a *Chiromantis* sp., a new genus to Borneo.**

**Description:**

- A small tree frog with a sharply pointed snout.
- The skin on the upper side is covered in small pits, giving them a slightly granular appearance.
- The eardrum is almost invisible and less than half the eye diameter.
- The toes are partially webbed, whilst the fingers have no webbing.
- The fingers are transparent.
- The colour can be variable, some specimens are a dark yellow with dark brown mottling, whilst other individuals are much paler.

**Size:** Males: 19-23 mm, Females: possibly larger.

**Habitat and Behaviour:**

- Recently discovered in the LK at a small location in Lot 2. Very similar specimens have also been found in Sumatra and Kalimantan.
- To date, only males have been located. Individuals were perched one to three meters off the ground in semi-inundated secondary forest.

**Call:** A distinctive, sharp single “tick”.