

Kalophrynus meizon Zug, 2015

Red-sided Sticky Frog

SVL to 58 mm

Morphology– Body stout; snout pointed; outer fingers and toes small; toes barely webbed; dorsal surface of females pebbly, that of males with tiny spines.

Colour– Back pale or dark brown, usually with darker blotches, flanks brownish-orange; a dark eye-like spot in inguinal region; throat and chest brown and rest of belly grey.

Reproduction– A phytohelm-breeder and possibly non-feeding.

Conservation Status– Not Evaluated.



Kaloula pulchra Gray, 1831

Malayan Bull Frog

SVL to 75 mm

Morphology– Body stout and inflated further when calling; head small; limbs short and thick; toes webbed at base; fingers long and widened at the tips.

Colour– Back dark brown or chocolate-coloured; a broad tan-coloured band along sides of head and body; chest and belly grey, with brown spots.

Reproduction– Eggs laid in temporary, standing bodies of water, such as gutters, pools and puddles; feeding and swimming tadpoles, black, mostly suspension feeders.

Conservation Status– Least Concern.



Metaphrynella sundana (Peters, 1867)

Bornean Tree Hole Frog

SVL to 25 mm

Morphology– Body robust; tips of fingers widened; inner metatarsal tubercle low; toes webbed; back and flanks with scattered tubercles.

Colour– Back pale to dark brown or grey-black, with a darker mark in the middle of the back; dorsal surface of fingers yellow to orange; belly grey.

Reproduction– Eggs laid in tree holes and bamboo internodes and other phytothelm; swimming tadpoles, do not feed, very small.

Conservation Status– Least Concern.



Microhyla malang Matsui, 2011
Bornean Narrow-mouthed Frog

SVL to 23 mm

Morphology– Body stocky, broad and depressed; head short, triangular; snout slightly pointed; tympanum not visible; four fingers; toe tips slightly widened.

Colour– Back brownish-pink to grey, with a light-edged, dark brown patch on the middle of the back; black blotches below eye and nares; black dots along flanks; belly mottled with brown.

Reproduction– Eggs laid as floating clutch in marshes and ponds; swimming and feeding tadpoles, suspension feeders, often close to the water surface.

Conservation Status– Not Evaluated.



Microhyla borneensis Parker, 1928

Matang Narrow-mouthed Frog SVL to 18.8 mm

Morphology– Body slender and depressed; head short, triangular; snout slightly pointed; tympanum absent; back with low tubercles and toe tips weakly swollen.

Colour– Back pale brown with a darker subtriangular pattern on shoulder region; flanks darker; belly grey with darker smudges.

Reproduction– Eggs laid in pitchers of *Nepenthes ampullaria*; swimming but non-feeding tadpoles develop in such waterbodies.

Conservation Status– Not Evaluated.



Abavorana luctuosa (Peters, 1871)

Mahogany Frog

SVL to 60 mm

Morphology– Body stout; head triangular; limbs short; tympanum as large as eye.

Colour– Back reddish-brown, sides and belly greyish-black; limbs dark with distinct narrow light grey bands.

Reproduction– Eggs laid in marshes and ponds; swimming and feeding tadpoles, very large, bottom dweller.

Conservation Status– Least Concern.



Chalcorana raniceps (Peters, 1871)

White-lipped Frog

SVL to 60 mm

Morphology– Body slender in males, relatively robust in adult females; head pointed; toes nearly completely webbed; finger and toe tips with disks; tympanum large.

Colour– Back green, changeable to brown; a distinct white lip; belly cream; ventral surface of thighs reddish-pink.

Reproduction– Eggs laid in forest streams as well as pools; tadpoles feeding and free-swimming, generalists.

Conservation Status– Least Concern.



Hylarana erythraea (Schlegel, 1827)

Green Paddy Frog

SVL to 75 mm

Morphology– Body robust; hind limbs long and muscular; toes half-webbed; skin of back smooth, with flat dorsolateral glandular ridges.

Colour– Back green with a broad cream-coloured dorsolateral bands; belly unpatterned cream.

Reproduction– Eggs laid in pools; tadpoles feeding and free-swimming, large.

Conservation Status– Least Concern.



Meristogenys jerboa (Günther, 1872)

Matang Torrent Frog

SVL to 63 mm

Morphology– Body slender in males, relatively more stocky in females; hind limbs very long; tips of fingers and toes expanded into disks; webbing on toes extensive; back without large tubercles or warts; black marking surrounding eye and tympanum extending to flank region; upper iris yellow and lower iris reddish.

Colour– Back dark brown; a blackish-brown lateral stripe; belly cream-coloured; undersurface of limbs yellow.

Reproduction– Eggs laid in swift-flowing rocky forest streams at medium to low elevations; tadpoles feeding and free-swimming, showing adaptations for such habitats, including oral and abdominal suckers.

Conservation Status– Vulnerable.



Meristogenys penrissenensis Shimada, Matsui, Nishikawa, and Eto, 2015

Penrissen Torrent Frog

SVL to 73 mm

Morphology– Body slender in males, relatively more stocky in females; hind limbs very long; tips of fingers and toes expanded into disks; webbing on toes extensive; back without large tubercles or warts. Temporal fold only vaguely edged by black line. Iris bicolored, upper and lower area greenish yellow, with red in between.

Colour– Back dark brown; a blackish-brown lateral stripe; belly cream-coloured; undersurface of limbs yellow.

Reproduction– Eggs laid in swift-flowing rocky forest streams at medium to low elevations; tadpoles feeding and freeswimming, showing adaptations for such habitats, including oral and abdominal suckers.

Conservation Status– Vulnerable.



Pulchrana baramica (Boettger, 1901)

Brown Marsh Frog

SVL to 71 mm

Morphology– Body slender; skin granular to slightly warty in texture; head relatively large; eye prominent; tympanum visible; toes about half webbed; fingers long; upper lip with pale spots.

Colour– Back mid-brown to dark brown, with darker spots on the sides; tympanum dark brown, with a distinct pale centre; belly cream or pale brown; iris golden with red-copper tint anterior and posterior to pupil.

Reproduction– Breeds in standing bodies of water, such as ponds and swamps; tadpoles unknown.

Conservation Status– Least Concern.



Pulchrana glandulosa (Boulenger, 1882)

Rough-sided Frog

SVL to 93 mm

Morphology– Body robust; head relatively large; skin granular with warts; flanks with large, flat warts; tympanum large; a large gland on upper arm; toes half webbed.

Colour– Back blackish-grey or dark brown, with darker patches; upper lip with pale spots; belly cream; iris red.

Reproduction– Breeds in standing bodies of water, such as ponds and swamps; tadpoles are of the feeding and swimming type, black, leaf litter specialists.

Conservation Status– Least Concern.



Pulchrana laterimaculata (Barbour & Noble, 1916)
Side-spotted Frog SVL to 47.5 mm

Morphology– Body slender; skin granular and tuberculate; head relatively large; eye prominent; tympanum visible; toes less than half webbed; fingers long.

Colour– Back dark brown, with darker spots on top and flanks, tympanum black, without a pale centre; belly cream or pale brown; iris golden on top, reddish-brown below.

Reproduction– Breeds in standing bodies of water, such as ponds and swamps; tadpoles unknown.

Conservation Status– Least Concern.



Pulchrana picturata (Boulenger, 1920)

Spotted Stream Frog

SVL to 68 mm

Morphology– Body slender; tympanum visible; tips of digits slightly swollen; toes over half webbed.

Colour– Back and sides dark brown to nearly black, with yellow or yellowish-orange angular spots; yellow-orange lateral stripe from snout to eye; spots behind eye; belly grey.

Reproduction– Eggs laid in forest streams; tadpoles feeding and free-swimming, black, in leaf litter.

Conservation Status– Least Concern.



Pulchrana signata (Günther, 1872)

Striped Stream Frog

SVL to 68 mm

Morphology– Body slender; tympanum visible; tips of digits slightly swollen; toes over half webbed.

Colour– Back and sides dark brown to nearly black, with yellow or orange spots, a red to orange stripe is starting from the snout and continues to the end of the body without interruption, separating on both sides the back from the flanks; belly grey.

Reproduction– Eggs laid in forest streams; tadpoles feeding and free-swimming, black, in leaf litter.

Conservation Status– Least Concern.



Staurois guttatus (Günther, 1858)

Black-spotted Rock Frog

SVL to 55 mm

Morphology– Body slender; snout pointed; skin of back granular with some rounded warts; toes fully webbed; tips of fingers and toes broad disk-like.

Colour– Back olive green to brown (especially in adult females), with large black spots, changeable to olive-green when stressed; webbing of toes turquoise blue; belly cream.

Reproduction– Eggs laid in forest streams; tadpoles feeding and free-swimming, in sidepools of rocky streams or rock troughs.

Conservation Status– Least Concern (as *Staurois natator*, now non-conspecific).



Feihyla kajau (Dring, 1984)

White-eared Tree Frog

SVL to 23 mm

Morphology– Body slender; fingers webbed to base; narrow dermal ridge along outer edges of hands, feet, tarsus and postcloacal region; vomerine teeth absent.

Colour– Back pale green, with sharp transition to cream at midflank; back white spotted; white spots on lips, tympanum and flanks; belly cream.

Reproduction– Eggs laid on leaves over forest pools; tadpoles feeding and free-swimming.

Conservation Status– Near Threatened.



Kurixalus appendiculatus (Günther, 1859)

Friiled Tree Frog

SVL to 50 mm

Morphology– Body slender; head triangular; males show a conical snout-tip; females with a conical snout-tip; toes with some free webbing; a narrow wavy fringe of skin along limbs; a series of serrated dermal projections ventrally along mandible.

Colour– Variable, back olive grey to brown, with darker markings; some frogs have a pink tinge on front edge of thighs and belly cream with a yellow tinge.

Reproduction– Eggs laid on leaves over forest pools; tadpoles feeding and free-swimming, small, bottom dweller.

Conservation Status– Least Concern.



Nyctixalus pictus (Peters, 1871)

Cinnamon Frog

SVL to 35 mm

Morphology– Body slender; hind limbs long; tympanum large, visible; tips of fingers and toes expanded; toes half webbed; skin on forehead and back rough.

Colour– Back and forehead cinnamon, orange or red, white spotted; iris white in dorsal third; belly cream.

Reproduction– Eggs laid in tree holes; tadpoles feeding and free-swimming, black, wide body.

Conservation Status– Near Threatened.



Philantus davidlabangi Matsui 2009

David Labang's Tree Frog

SVL to 20.6 mm

Morphology– Body stout; snout shorter than eye diameter; tympanum distinct; limbs short, toes well webbed; fifth toe webbed to beyond distal edge of subarticular tubercle; nuptial pads absent.

Colour– Back light brown; dark-brown interorbital bar; supratympanic stripe present; dark brown X-shaped mark on dorsum; belly reddish-brown.

Reproduction–Direct development, with eggs produced in moist habitats; metamorphs emerge directly from eggs.

Conservation Status– Data Deficient.



Philautus kakipanjang Dehling & Dehling, 2013
Long-legged Bush Frog SVL to 24 mm

Morphology– Body relatively stout; back smooth with conical tubercles; snout acuminate; heel without dermal appendage; hind limbs long, nuptial pads small; toes well webbed.

Colour– Back reddish-brown, with greyish-brown interorbital stripe, canthal stripe and paravertebral pattern; tympanum yellowish-brown; belly cream coloured, speckled with yellow, sides yellow; iris golden.

Reproduction– Life history unstudied; relatives show direct development, with eggs produced in moist habitats; metamorphs emerge directly from eggs.

Conservation Status– Not Evaluated.



Philautus kerangae Dring, 1987

Kerangas Bush Frog

SVL to 43 mm

Morphology– Body relatively stout; back weakly tuberculate; head broader than long; tympanum indistinct; supratympanic fold present; toes extensively webbed; belly wrinkled; nuptial pads absent.

Colour– Back sandy brown with green areas; dark interorbital bar and dark V-shaped mark from nape to groin; limbs with dark cross-bars; belly with contrasting cream, blue and dark brown markings; iris yellow with dark reticulation.

Reproduction– Life history unstudied; relatives show direct development, with eggs produced in moist habitats; metamorphs emerge directly from eggs.

Conservation Status– Endangered.



Philautus larutensis (Boulenger, 1900)

Sunda Bush Frog

SVL to 35 mm

Morphology– Body stout; limbs short; conical tubercle at tibiotarsal region; tympanum indistinct; toes between half to three-fourths webbed; back finely pebbled; eyelids warty.

Colour– Back reddish-brown or greyish-brown, sometimes darker or lighter spots; pale areas below eye; limbs with dark cross-bars.

Reproduction– Life history unstudied; relatives show direct development, with eggs produced in moist habitats; metamorphs emerge directly from eggs.

Conservation Status– Not Evaluated.



Philautus refugii Inger & Stuebing, 1996

Bukit Lanjak Bush Frog

SVL to 19.6 mm

Morphology– Body stocky; head as wide as body; back with small, rounded tubercles; tympanum less than half eye diameter; toe webbing does not reaching beyond distal subarticular tubercles of Toes III and V; conical tubercle at juncture of tibiotarsal region; belly coarsely granular.

Colour– Back brown with darker spots or H- or X-shaped markings; brown-edged white spots on groin; limbs with dark cross-bars; anterior thighs white with narrow brown bars or brown with large white spots; back of thigh reddish-brown; belly white.

Reproduction– Life history unstudied; relatives show direct development, with eggs produced in moist habitats; metamorphs emerge directly from eggs.

Conservation Status– Vulnerable.



Philautus tectus Dring, 1987

Obscure Bush Frog

SVL to 27 mm

Morphology– Body slender; head narrow; lores deeply concave; hind limbs long; nuptial pads large; tips of fingers and toes expanded into disks; toes half-webbed; back weakly tuberculate.

Colour– Back tan, yellow red or green, changing under stress to mottled grey and brown; a narrow yellowish-orange stripe sometimes present; a light-edged dark bar between the eyes; belly greyish-cream.

Reproduction– Direct development, with eggs produced in moist habitats; metamorphs emerge directly from eggs.

Conservation Status– Vulnerable.



Polypedates colletti (Boulenger, 1890)

Collett's Tree Frog

SVL to 78 mm

Morphology– Body slender; head triangular; snout acutely pointed; tympanum distinct; most toes extensively webbed; back and belly coarsely granular; a conical appendage on heel.

Colour– Back tan to reddish-brown or brownish-grey; a dark hour-glass shaped pattern; flanks with scattered dark spots; limbs with dark bars.

Reproduction– Eggs are deposited in shallow forest pools, frequently in blackwater habitats. The feeding and swimming tadpoles develop in such habitats.

Conservation Status– Least Concern.



Polypedates leucomystax (Gravenhorst, 1829)

Four-lined Tree Frog

SVL to 75 mm

Morphology– Body slender in males, robust in females; snout profile rounded; fingers free of web; no fringe of skin along arm; no tubercle on heel; skin smooth.

Colour– Back variable, ranging from yellow, olive to brownish-yellow, with or without dark lines on back; belly cream.

Reproduction– Eggs laid in a foam nest on leaves and branches, feeding and swimming tadpoles in ponds.

Conservation Status– Least Concern.



Polypedates macrotis (Boulenger, 1891)

Dark-eared Tree Frog

SVL to 90 mm

Morphology– Body slender in males, robust in females; eyes large; tips of fingers and toes disk-like; skin smooth.

Colour– Back and forehead dark brown; a dark brown band from nostril through eyes and across tympanum to midflanks; belly cream.

Reproduction– Eggs laid in a foam nest on leaves and branches, feeding and swimming tadpoles in ponds.

Conservation Status– Least Concern.



Polypedates otilophus (Boulenger, 1893)

File-eared Tree Frog

SVL to 97 mm

Morphology– Body robust; a bony ridge over tympanum; head large, triangular; tips of fingers and toes disk-like; toes half webbed; a fleshy projection at heel.

Colour– Back and forehead bright yellow to yellowish brown, with thin dark lines; belly cream.

Reproduction– Eggs laid in a foam nest on leaves and branches; feeding and swimming tadpoles in ponds.

Conservation Status– Least Concern.



Rhacophorus borneensis Matsui, Shimada & Sudin, 2013
Bornean Tree Frog SVL to 65 mm

Morphology– Body robust; head as long as wide; tympanum and supratympanic fold distinct; webbing broad on fingers and toes; distinct, smooth-edged skin fringe from outer edge of Finger IV to elbow.

Colour– Back and limbs pale green; elongated black patch from lower surface of lower arm to beginning of flanks; rest of flanks yellowish-orange, with black flecks; belly yellow, with darker variegation; webs dorsally black, with some blue streaks, edges yellowish-orange.

Reproduction– Eggs laid in a foam nest on leaves and branches, feeding and swimming tadpoles in ponds.

Conservation Status– Not Evaluated



Rhacophorus cyanopunctatus Manthey & Steiof, 1998
Blue-spotted Tree Frog SVL to 43 mm

Morphology– Body slender; snout slender; tympanum diameter wider than half eye diameter; supratympanic fold distinct; outer fingers well webbed; heel without dermal projection; nuptial pads absent.

Colour– Back tan or brown, sometimes with darker blotches and narrow interorbital bar; white patch below eye; flanks and thighs with blue patches; belly yellow.

Reproduction– Breeds in rocky streams; feeding and free-swimming tadpoles with sucker mouth.

Conservation Status– Least Concern



Rhacophorus dulitensis Boulenger, 1892

Jade Tree Frog

SVL to 50 mm

Morphology– Body slender; snout rounded; tympanum two-thirds eye diameter; supratympanic fold absent; back smooth; flap above vent present, narrow skin fringe along outer forearm; small cone on heel.

Colour– Back pale green, with scattered white spots; purple spots on forehead and back; purple line from eye to eye around snout and passing through nostrils; reddish-brown patch on eyelid; webbing on feet green.

Reproduction– Breeds in rainwater pools and swamps; tadpoles are the feeding, free-swimming type, bottom dwellers.

Conservation Status– Near Threatened



Rhacophorus gadingensis Das & Haas, 2005

Gunung Gading Tree Frog

SVL to 30 mm

Morphology– Body slender; head wider than long; dermal flap along forearm; heel spur present; supratympanic fold weak; inner metatarsal tubercle indistinct or absent; back and limbs smooth, few tubercles below vent; external vocal sacs absent.

Colour– Back brown, with dark interorbital bar; dark brown blotches on back and sides with blue blotches; chin and throat of females unpigmented yellow-cream; iris golden with copper tint around pupil.

Reproduction– Eggs laid in running water; feeding and swimming tadpoles with sucker mouth.

Conservation Status– Data Deficient.



Rhacophorus nigropalmatus Boulenger, 1895
Wallace's Flying Frog SVL to 100 mm

Morphology– Body robust; snout rounded; tips of fingers and toes disk-like, fully webbed; fleshy projection on heel.

Colour– Back bright green, with white spots; webbing black margined with yellow; iris pale yellow venter yellowish-cream.

Reproduction– Eggs laid in pond and other depressions on forest floor; large feeding and swimming tadpoles develop in such environments.

Conservation Status– Least Concern.



Rhacophorus pardalis Günther, 1859

Harlequin Tree

SVL to 75 mm

Morphology– Body relatively slender in males, robust in females; snout rounded; tips of fingers and toes disk-like; fingers and toes fully webbed; fleshy flap at heel.

Colour– Back and forehead reddish-orange, pink or reddish-brown, with darker markings; webbing orange to red; iris tan; belly yellow, with red areas.

Reproduction– Eggs laid in a foam nest on leaves and branches; feeding and swimming tadpoles in ponds.

Conservation Status– Least Concern.



Ichthyophis asplenus (Taylor, 1965)

Broad-striped Caecilian

SVL to 204 mm

Morphology– Body length 23–26 times body width; total annuli 247–270; grooves and folds do not cross back except in posterior half of body; splenial teeth absent in adults.

Colour– Back bluish-grey, with a yellow lateral stripe.

Reproduction– Unknown.

Conservation Status– Data Deficient.



Ichthyophis biangularis Taylor, 1965

Angular Caecilian

SVL to 253 mm

Morphology– Body length 26 times body width; primary and secondary annuli form angles pointed forward dorsally; total annuli 330–333; annuli on tail 10.

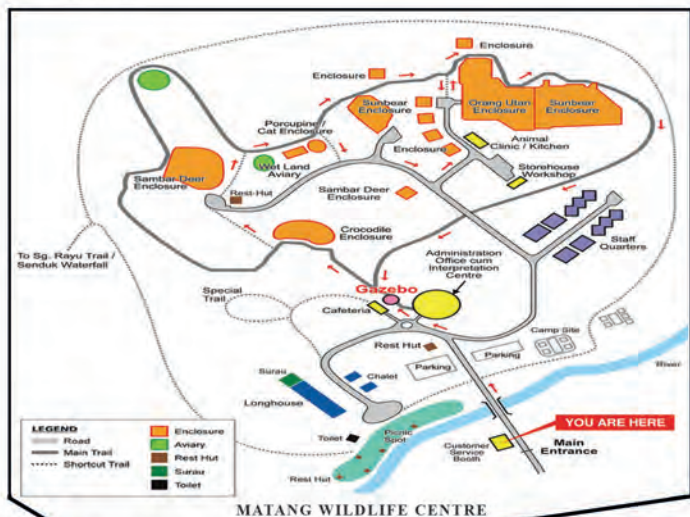
Colour– Back blackish-slate with a yellow lateral stripe.

Reproduction– Unknown.

Conservation Status– Data Deficient.



MAPS



MATANG WILDLIFE CENTRE

KUBAH NATIONAL PARK

LEGEND

- Rayu Trail (3830 m)
- Waterfall Trail (1600 m)
- Selang Trail (1557 m)
- Main Trail (1912 m)
- Serapi Summit Trail (5000 m)
- Palmetum (255 m)
- Frog Pond (700 m)
- Belian Trail (1429 m)



REFERENCES

- Frost, D.R. 2018.** Amphibian species of the world: an online reference. Version 6.0 (27 April 2018). Electronic Database accessible at <http://research.amnh.org/herpetology/amphibia/index.php>. American Museum of Natural History, New York, USA.
- Hazebroek, H.P. & A.K.A. Morshidi. 2000.** National Parks of Sarawak. Natural History Publications (Borneo) Sdn. Bhd, Kota Kinabalu. xii + 503 pp.
- Inger, R.F. 1966.** The systematics and zoogeography of the Amphibia of Borneo. *Fieldiana Zoology* 52:1–402. Reprinted 1990 and 2005, by Lun Hing Trading, Kota Kinabalu and Natural History Publications (Borneo) Sdn. Bhd., Kota Kinabalu, respectively.
- Inger, R.F., R.B. Stuebing, T.U. Grafe & J.M. Dehling. 2017.** A field guide to the frogs of Borneo. Third Edition. Natural History Publications (Borneo) Sdn Bhd., Kota Kinabalu. viii + 228 pp.

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