

LAND SNAKES OF MEDICAL SIGNIFICANCE IN MALAYSIA



Ahmad Khaldun Ismail, Teo Eng Wah, Indraneil Das, Taksa Vasaruchapong & Scott A. Weinstein

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Scott A. Weinstein

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Malaysia Biodiversity Information System (MyBIS)



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Yasser Mohamed Ariffin

Overview

The range of snakes of medical significance in Malaysia currently encompasses four families of snakes (Natricidae, Elapidae, Pythonidae and Viperidae). There are limited data on the distribution of snakes in the country. The following account is based on available published information on snakes recorded from Peninsular Malaysia, Labuan, Sabah and Sarawak. This book should be viewed as a guide, especially for healthcare providers, to identify and manage potential envenoming from snakebites in Malaysia. Information on the snake species listed here is based on the local data and those from neighbouring countries. Due to their geographical proximity, snakes occurring in Peninsular Malaysia are genetically closer to those from Thailand and Singapore, while those on Sabah and Sarawak are naturally closer to populations from Brunei Darussalam, Kalimantan and islands of the southern Philippines.

While a majority of snakes occurring in Malaysia are non-venomous, and constitute no threat to humans, a number of species can cause mild to severe envenoming that may lead to permanent disability or even death in humans.

The main groups of medically significant snakes in Malaysia are:

- Elapidae (front-fanged snakes) are venomous snakes, which are potentially dangerous and capable of causing significant systemic and local envenoming syndrome. This group includes all sea snakes, of which many are considered highly dangerous and may cause significant systemic envenoming syndrome. Other members include cobras, the king cobra, kraits and coral snakes.

- Viperidae (vipers and pit vipers are also front-fanged snakes), which could cause significant local and systemic envenoming syndrome.
- Natricidae (non-front-fanged) snakes, of which two or three species in Malaysia are potentially dangerous, in being able to cause significant systemic and local envenoming syndromes, while some of the others could probably cause limited local reactions.
- Pythonidae (the giant constricting snakes), including pythons, all species in this family are potentially dangerous to humans and can cause significant local injuries. Large-growing members of this species can even constrict and consume adult humans.

The purpose of this book is to highlight the potentially dangerous species to humans, with a list of the main potentially medically significant snakes. It is important to note that if a species is not listed below, it does not necessarily mean that it does not exist in Malaysia nor that its bite cannot cause harmful effects in humans. In particular, the list of colubrid (non-front-fanged) snakes has been selective, to include only a number known to be of potential medical significance. It is also important to note that a poor surveillance of the pet trade and irresponsible importation of exotic snakes may introduce a medically significant species, which is not indigenous to Malaysia. This may add to the complexity of managing envenomings in this country.

Identifying Snakes in Malaysia

1. A reliable reference is invaluable for helping accurate identification of snakes. Several are available in the market, and all illustrate the species of medical significance. You should be familiar with at least some of the identification characteristics of the potentially dangerous snakes in Malaysia.
2. The most noticeable characteristic about any snake, at first glance, will be its colour. This can help identify some snakes that are very distinctive in colouration. However, snakes also vary in colouration, and several non-venomous snakes are known to mimic venomous ones. Within the same species, the sexes and growth stages may display different colouration.
3. An excellent character for the identification of snakes is its scales. The shape, texture and number of scales are often unique to each species. A knowledge of scale morphology is useful if you have found a dead snake or a shed skin, but not always useful for the identification of a live snake, for obvious reasons!
4. Knowledge of the geographical distribution of a snake is helpful for its identification. Several snakes are found widespread in the country, while others have limited range, and may be further restricted to specific altitudes and habitats.

5. Knowledge of the biology, including habitat (e.g. terrestrial/ arboreal/fossorial/aquatic) is also useful for making a positive identification- knowing where particular snakes tend to live will help you identify them.
6. Knowledge of patterns of activity (diurnal/nocturnal/ crepuscular) of snakes may also help in identification.



© Ahmad Khalidun

Elephant Trunk Snake
Acrochordus javanicus

Note:

The scientific name used in this book's snake profiles are based on Uetz P. & Hošek, J. 2017. The Reptile Database. 15 Oct 2017. <http://www.reptile-database.org>. Accessed 6 November 2017.

Symbols for Snake Profile

Snake Food



Rodent / Mammal Bird Frog/Toad Snake Fish Lizard

Venom Level



Non Venomous Venomous

Snake Habitat



ARBOREAL Living in tress
TERRESTRIAL Living on land
FOSSORIAL Living digging & bury themselves underground
SEMI AQUATIC Living partly on land and in water
AQUATIC Living in water

Behaviour



Diurnal Nocturnal

Antivenom

NKAV Cobra Antivenin	OHAV King Cobra Antivenin	BCAV Malayan Krait Antivenin	BFAV Banded Krait Antivenin	CRAV Malayan Pit Viper Antivenin
GPAV Green Pit Viper Antivenin	HPAV Hemato Polyvalent Snake Antivenom	NPAV Neuro Polyvalent Snake Antivenom	RTAV Tiger Keelback Antivenom	



Instructions for Identification



1. Measure the length (and diameter) of the snake. Standard measurements of snakes include tail length, head to vent length and head width (especially relative to its neck).
2. Notice and describe the colours on the snake's body, as well as any patterns. Stripes are marks lengthwise along the body; bands are marks across the body.
3. Look at the shape of snake's head and tail (size and arrangement of scales on the top of its head and under its tail are important for identification).
4. Observe and count the scales (on head/midbody/anal/subcaudals) on dead snakes. Observations on scales, including texture (bearing a keel or not), pattern (overlapping or situated next to each other) and colouration, in combination with other morphological characteristics, are the principal means of classifying snakes to level of species.
5. Take pictures from different perspectives, especially entire body in dorsal and ventral views (so that scale counts can be made later), head from dorsum, venter as well as lateral views. Specialists of snakes can typically identify the snake from these images.

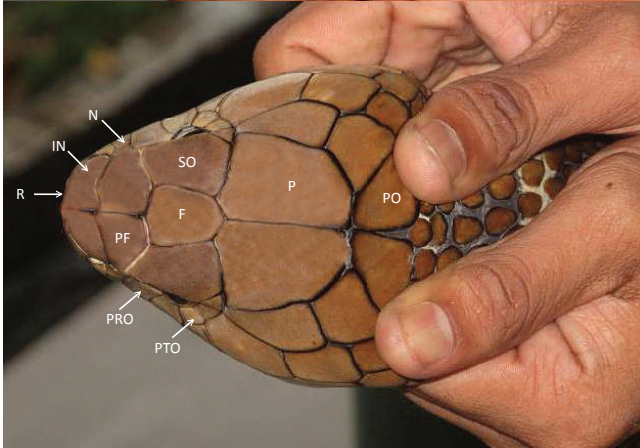
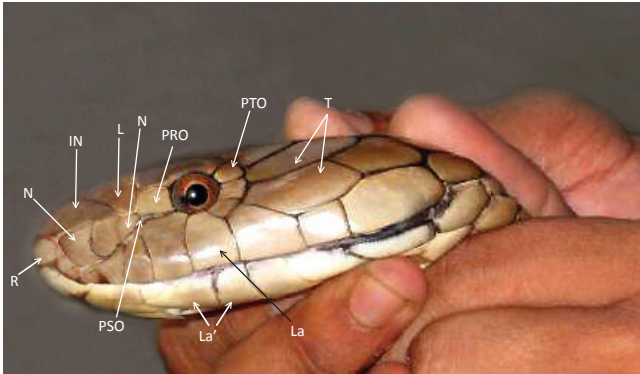
Pit Vipers – Head Shape & Scalation



Note:

There is no simple way of differentiating a venomous snake from a non-venomous one. Determining whether a snake is venomous is correctly done by identification of the species with the help of snake systematists. In their absence, close examination of the snake (make sure that they are truly dead! Wounded snakes may appear dead, and venomous species can inject venom after death if carelessly handled – always treat a 'dead' specimen with great caution and confirm the specimen is truly dead before relaxing such cautions!) or good quality pictures, and using authoritative references on the snakes of the particular geographical region, will help to identify it. Reliable identification can be used to guide the most appropriate management of the patient.

Elapidae/Colubridae – Head Shape & Scalation



- F** – frontal
- IN** – internasal
- L** – loreal
- La** – supralabial
- La'** – infralabial
- N** – nasal
- P** – parietal
- PF** – prefrontal
- PRO** – preocular
- PSO** – presubocular
- PTO** – postocular
- R** – rostral
- SO** – supraocular
- T** – anterior & posterior temporals
- PO** – postoccipital

ELAPIDAE



Adult
© Teo Eng Wah

MyBIS: 20831



IUCN Red List



Malayan Krait (EN) Ular Katam Tebu (BM)
Bungarus candidus



Adult
© Teo Eng Wah



Adult
© Teo Eng Wah



© Tom Charlton
Juvenile



© Taksa Vasaruchapong
Juvenile

ELAPIDAE



Juvenile
© Taksa Vasaruchapong

MyBIS: 9935



IUCN Red List



BFAV

NPAV



Banded Krait (EN) Ular Katam Belang (BM)
Bungarus fasciatus



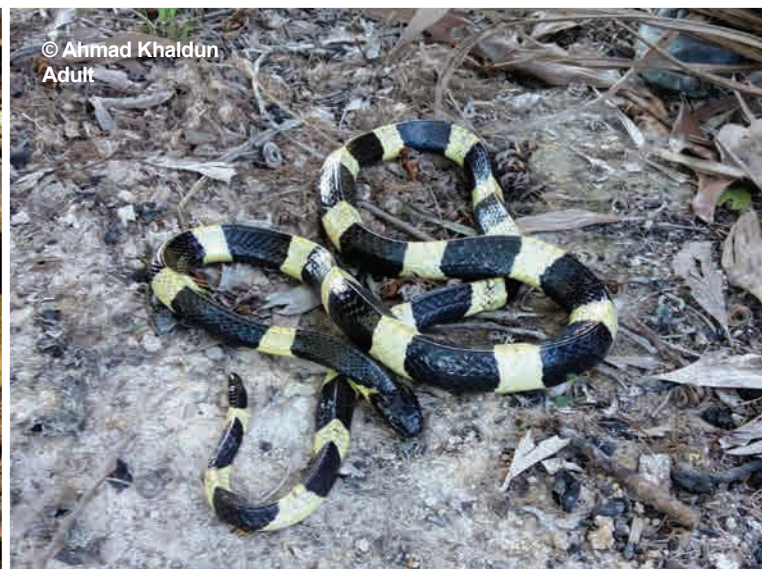
Adult
© Teo Eng Wah



Adult
© Teo Eng Wah



© Tom Charlton
Adult



© Ahmad Khalidun
Adult

ELAPIDAE



Adult
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MyBIS: 9936



IUCN Red List



NPAV



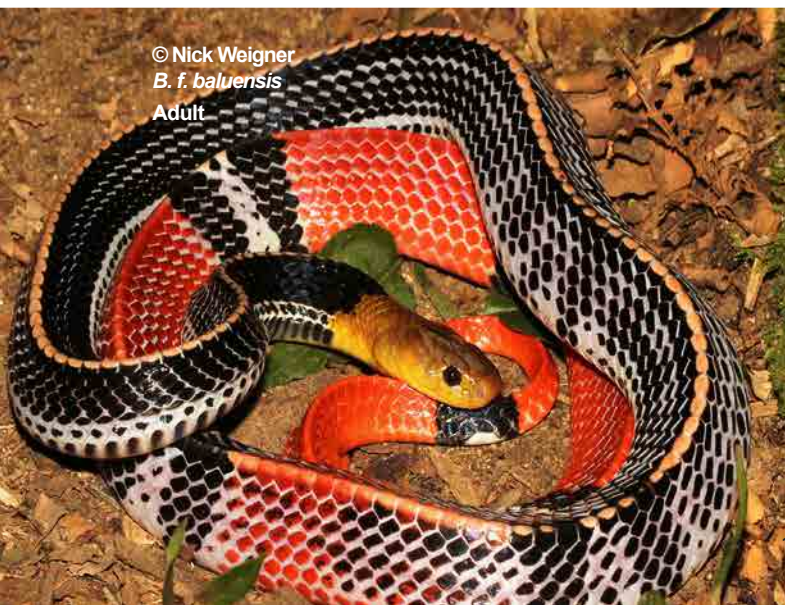
Red-headed Krait (EN) Ular Katam Kepala Merah (BM)
Bungarus flaviceps



Adult
© Stephen Hogg



Adult
© Teo Eng Wah



© Nick Weigner
B. f. baluensis
Adult



© Tom Charlton
B. f. baluensis
Adult

ELAPIDAE



Adult
© Teo Eng Wah

MyBIS: 21355



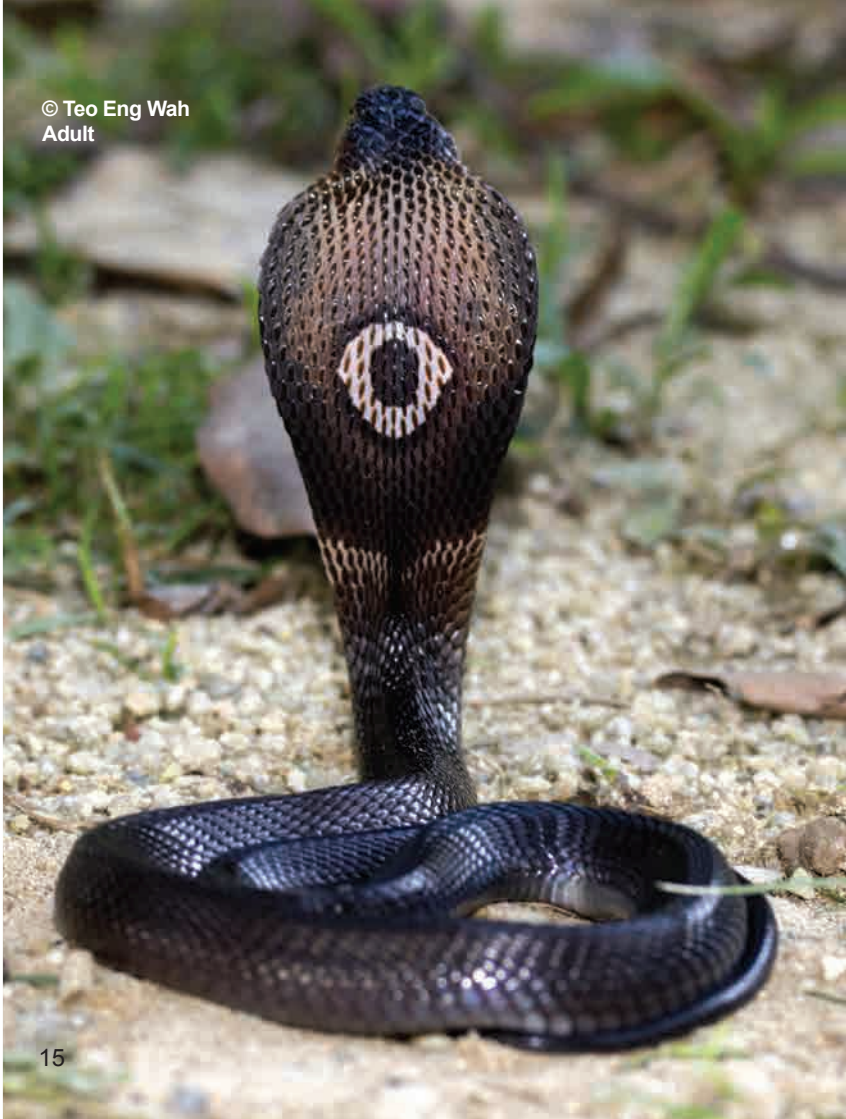
IUCN Red List



Monocled Cobra (EN) Ular Senduk (BM)
Naja kaouthia



Juvenile
© Teo Eng Wah



© Teo Eng Wah
Adult



© Taksa Vasaruchapong
Adult

ELAPIDAE



Adult
© Teo Eng Wah

MyBIS: 21356

IUCN Red List



Sumatran Spitting Cobra (EN) Ular Senduk Sembur (BM)
Naja sumatrana



Adult
© Teo Eng Wah



Adult
© Teo Eng Wah



Juvenile
© Indraneil Das



© Teo Eng Wah
Golden Spitting Cobra
Adult



© Taksa Vasaruchapong
Golden Spitting Cobra
Adult



Golden Spitting Cobra
© Taksa Vasaruchapong

ELAPIDAE



Adult
© Ahmad Khalidun Ismail

MyBIS: 9942



IUCN Red List



King Cobra (EN) Ular Tedung Selar (BM)
Ophiophagus hannah



Adult
© Teo Eng Wah



© Tom Charlton
Juvenile



Adult
© Teo Eng Wah

ELAPIDAE



Adult
C. b. flaviceps
© Teo Eng Wah

MyBIS: 48553



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Blue Malay Coral Snake (EN) Ular Pantai Biru (BM)

Calliophis bivirgatus



Adult
C. b. flaviceps
© Stephen Hogg



© Indraneil Das
C. b. tetrataenia
Adult



© Teo Eng Wah
C. b. flaviceps
Adult



© Teo Eng Wah
C. b. tetrataenia
Adult

ELAPIDAE



Adult
© Indraneil Das

MyBIS: 20886



IUCN Red List



Malayan Striped Coral Snake (EN) Ular Pantai Belang (BM)
Calliophis intestinalis



Adult
© Teo Eng Wah



Adult
© Teo Eng Wah



© Teo Eng Wah
Adult

ELAPIDAE



Adult
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Speckled Coral Snake (EN) Ular Pantai Bintik Kecil (BM)

Calliophis maculiceps



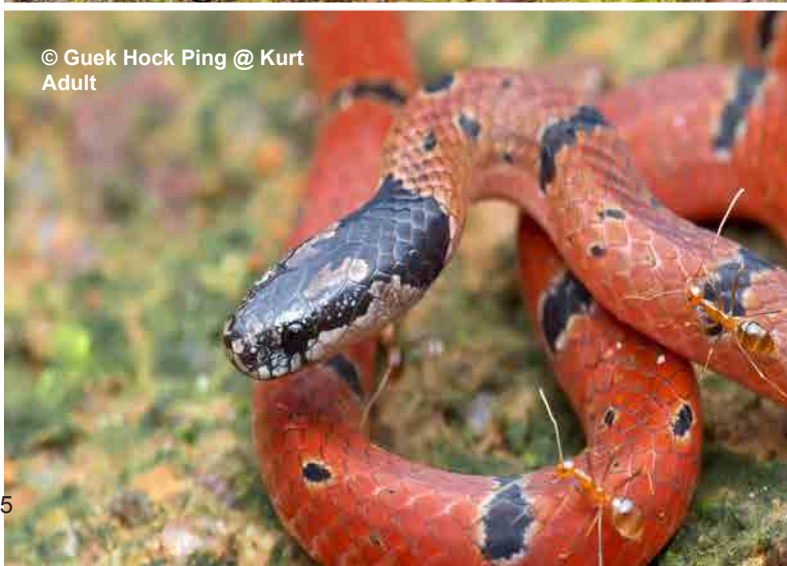
Adult
© Guek Hock Ping @ Kurt



Adult
© Tom Charlton



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Adult



© Guek Hock Ping @ Kurt
Adult

ELAPIDAE



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IUCN Red List



Spotted Coral Snake (EN) Ular Pantai Bintik (BM)

Calliophis gracilis



Adult
© Indraneil Das

Red-bellied Keelback (EN)
Rhabdophis conspicillatus



MyBIS: 9926



NATRICIDAE



Adult
© Tom Charlton

MyBIS: 9927



IUCN Red List



Speckle-bellied Keelback (EN) Ular Rabong Perut Bintik (BM)
Rhabdophis chrysargos



Adult
© Teo Eng Wah



© M. A. Muin
Juvenile



© M. A. Muin
Juvenile

NATRICIDAE



Adult
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Blue-necked Keelback (EN)
Macropisthodon rhodomelas



NATRICIDAE



Adult
© Mary-Ruth Low

MyBIS: 21336

IUCN Red List



Orange-necked Keelback (EN)
Macropisthodon flaviceps



Adult
© Mary-Ruth Low



© Guek Hock Ping @ Kurt
Juvenile



Juvenile
© Guek Hock Ping @ Kurt



© Guek Hock Ping @ Kurt
Juvenile

NATRICIDAE



Adult
© Remco Hofland

MyBIS: 21530



IUCN Red List



Gunung Murud Keelback, Muruden Keelback (EN)
Rhabdophis murudensis



Adult
© Remco Hofland



© Remco Hofland
Adult



© Remco Hofland
Adult

NATRICIDAE



Adult
© Taksa Vasaruchapong

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IUCN Red List



Red-necked Keelback (EN)
Rhabdophis subminiatus



Adult
© Taksa Vasaruchapong



Juvenile
© Max Jackson



© Guek Hock Ping @ Kurt
Adult



© Gernot Vogel
Juvenile

PYTHONIDAE



Juvenile
© Teo Eng Wah

MyBIS: 58057



Reticulated Python (EN) Ular Sawa Batik (BM)
Malayopython reticulatus



Juvenile
© Teo Eng Wah



Adult
© Ahmad Khalidun



© Teo Eng Wah
Juvenile



© Teo Eng Wah
Adult

PYTHONIDAE



Adult
© Teo Eng Wah

MyBIS: 21538

IUCN Red List



Bornean Short Tailed (EN) Ular Sawa Darah (BM)
Python breitensteini



Adult
Female
© Teo Eng Wah



Adult
© Teo Eng Wah



© Teo Eng Wah
Female
Adult



© Teo Eng Wah
Female
Adult

PYTHONIDAE



Adult
© Teo Eng Wah

MyBIS: 21539



IUCN Red List



Brongersma's Short Python (EN)
Python brongersmai



Adult
© Teo Eng Wah



Adult
© Teo Eng Wah



© Teo Eng Wah
Juvenile



© Teo Eng Wah
Juvenile

VIPERIDAE



Adult
© Teo Eng Wah

MyBIS: 20891



IUCN Red List



Malayan Pit Viper (EN) Ular Kapak Daun, Ular Kapak Bodoh (BM)
Calloselasma rhodostoma



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Adult



Adult
© Taksa Vasaruchaporn



© Teo Eng Wah
Adult



© Teo Eng Wah
Adult

VIPERIDAE



Adult
© Tom Charlton

MyBIS: 22578



IUCN Red List



Kinabalu Brown Pit Viper (EN)
Garthius chaseni



Adult
© Guek Hock Ping @ Kurt

47



Adult
© Guek Hock Ping @ Kurt

VIPERIDAE



Adult
© Stephen Hogg

MyBIS: 57996



IUCN Red List



Malayan Brown Pit Viper (EN)
Ovophis convictus



Adult
© Teo Eng Wah



Adult
© Stephen Hogg



© Teo Eng Wah
Juvenile



© Teo Eng Wah
Juvenile

VIPERIDAE



Adult
© Indraneil Das

MyBIS: 21659



IUCN Red List



Bornean Palm Pit Viper (EN) Ular Kapak Borneo (BM)
Trimeresurus borneensis



Sub-Adult
© Tan Song Wei



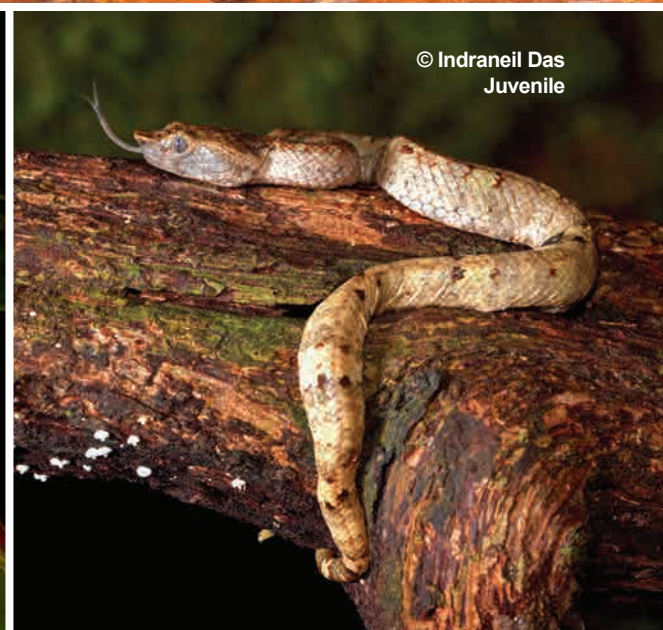
Sub-Adult
© Tan Song Wei



© Tan Song Wei
Sub-Adult



© Indraneil Das
Juvenile



© Indraneil Das
Juvenile



© Max Ong Wei Ling
Adult

VIPERIDAE



Adult
© Peter Lee Shiuh Hwa

MyBIS: 58166



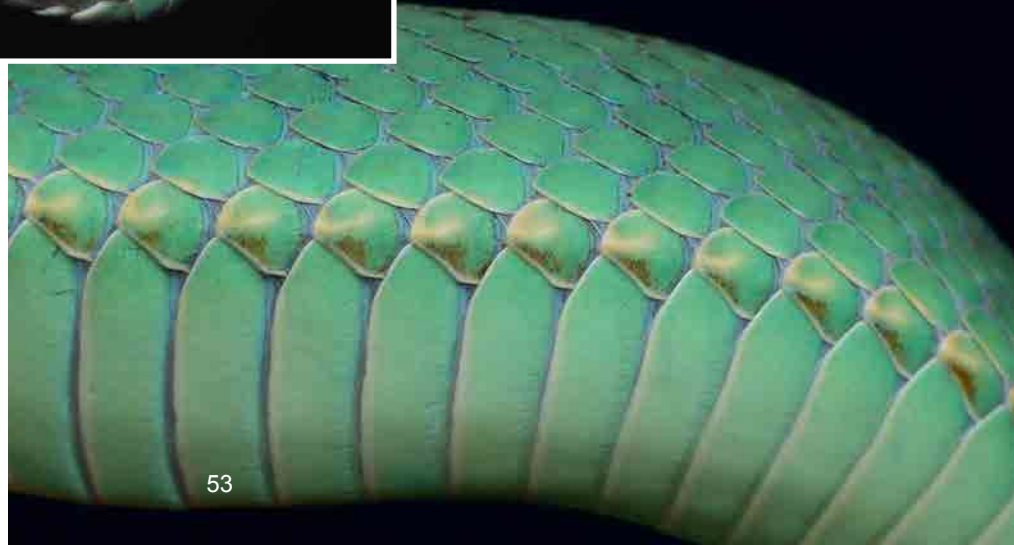
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Tioman Pit Viper (EN) Ular Kapak Tioman (BM)
Trimeresurus buniana



Adult
© Peter Lee Shiuh Hwa



Adult
© Peter Lee Shiuh Hwa

VIPERIDAE



Adult
Male
© Teo Eng Wah

MyBIS: 58164



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Thai Peninsula Pit Viper (EN)
Trimeresurus fucatus



Adult
Male
© Teo Eng Wah



Adult
Female
© Teo Eng Wah



© Teo Eng Wah
Male
Adult



Adult
Female
© Teo Eng Wah

VIPERIDAE



Adult
© Teo Eng Wah

MyBIS: 21437



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Hagen's Pit Viper (EN) Ular Kapak Hijau (BM)
Trimeresurus hageni



Juvenile
© Teo Eng Wah



Adult
Shedding
© Teo Eng Wah



© Taksa Vasaruchapong
Adult



© Teo Eng Wah
Female
Adult

VIPERIDAE



Adult
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MyBIS: 58145



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Kinabalu Pit Viper (EN)
Trimeresurus malcolmi



Adult
© Tom Charlton



Adult
© Indraneil Das



Adult
© Guek Hock Ping @ Kurt

VIPERIDAE



Adult
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Cameron Highlands Pit Viper (EN)
Trimeresurus nebularis



Adult
© Teo Eng Wah



Adult
© Stephen Hogg



© Teo Eng Wah
Adult



© Teo Eng Wah
Adult

VIPERIDAE



Adult
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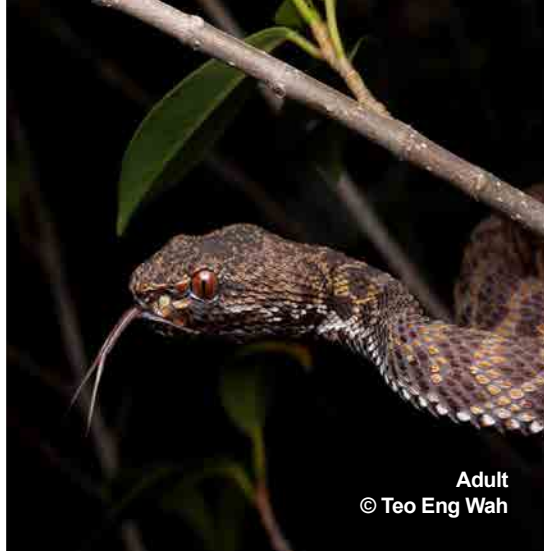
IUCN Red List



Mangrove Pit Viper (EN) Ular Kapak Bakau (BM)
Trimeresurus purpureomaculatus



Adult
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Adult
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Adult
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VIPERIDAE



Adult
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Sabah Green Pit Viper (EN)
Trimeresurus sabahi



Adult
© Indraneil Das



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Adult

© Indraneil Das
Adult



VIPERIDAE



Adult
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MyBIS: 58157



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Sumatran Pit Viper (EN) Ular Kapak Sumatra (BM)
Trimeresurus sumatranus



Adult
© Indraneil Das



Juvenile
© Teo Eng Wah

VIPERIDAE



Adult
© Tom Charlton

MyBIS: 53771



GPAV



HPAV



Beautiful Pit Viper (EN)
Trimeresurus venustus



Adult
© Tom Charlton

VIPERIDAE



Adult
© Teo Eng Wah

MyBIS: 53772



IUCN Red List



Wirot's Palm Pit Viper (EN)
Trimeresurus wiroti



Adult
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Adult
© Teo Eng Wah

© Teo Eng Wah
Adult



© Gernot Vogel
Adult



VIPERIDAE



Adult
Female
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MyBIS: 57443



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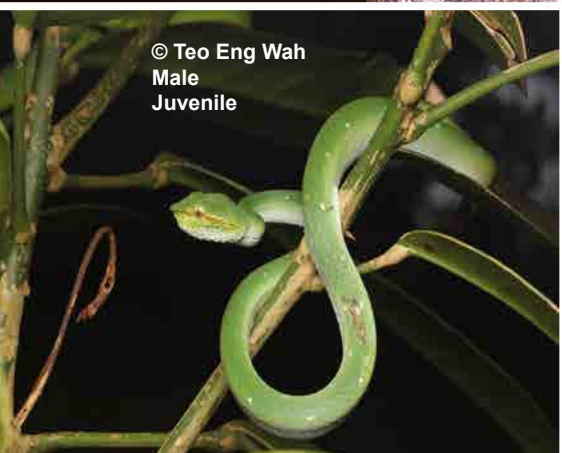
Bornean Keeled Pit Viper (EN)
Tropidolaemus subannulatus



© Indraneil Das
Male
Adult



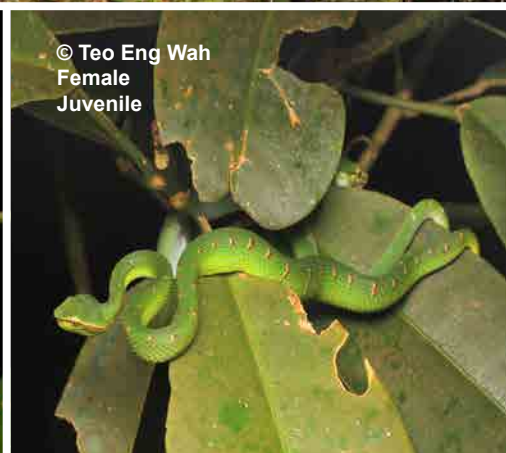
Adult
Female
© Teo Eng Wah



© Teo Eng Wah
Male
Juvenile



© Teo Eng Wah
Male
Juvenile



© Teo Eng Wah
Female
Juvenile

VIPERIDAE



Adult
Female
© Teo Eng Wah

MyBIS: 21662



IUCN Red List



Wagler's Pit Viper (EN) Ular Kapak Tokong (BM)
Tropidolaemus wagleri



Adult
Female
© Teo Eng Wah



Adult
Male & Female
© Teo Eng Wah



© Teo Eng Wah
Male
Adult



© Teo Eng Wah
Male
Adult



© Teo Eng Wah
Male
Adult

Snakebite:

Do's



Calm down,
reduce movements
and immobilize



Bring patient to the nearest hospital with
emergency care



Don'ts



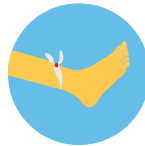
Go to a tantrik or
shaman



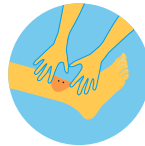
Suck the wound



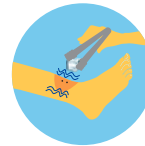
Cut the wound



Tie ligatures



Massage



Apply ice or
electric shock



Burn the wound



Apply or ingest
herbal remedies

ANTIVENOMS APPROPRIATE FOR MALAYSIA

Antivenom raised from	Antivenom manufacturer	First Dose/vials
Monocled Cobra, <i>Naja kaouthia</i>	QSMI Thai Red Cross: Cobra Antivenin to neutralize 0.6 mg/ml of venom	100mls/10 vials Subsequent dose 1-2 hr
King Cobra, <i>Ophiophagus hannah</i>	QSMI Thai Red Cross: King Cobra Antivenin to neutralize 0.8 mg/ml of venom	100mls/10 vials Subsequent dose 1-2 hr
Malayan Krait, <i>Bungarus candidus</i>	QSMI Thai Red Cross: Malayan Krait Antivenin to neutralize 0.4 mg/ml of venom	50mls/5 vials Subsequent dose 1-2 hr
Banded Krait, <i>Bungarus fasciatus</i>	QSMI Thai Red Cross: Banded Krait Antivenin to neutralize 0.6 mg/ml of venom	50mls/5 vials Subsequent dose 1-2 hr
Malayan Pit Viper, <i>Calloselasma rhodostoma</i>	QSMI Thai Red Cross: Malayan Pit Viper Antivenin to neutralize 1.6 mg/ml of venom	30mls/3 vials Subsequent dose 6 hr
Green Pit Viper, <i>Cryptelytrops albolabris</i>	QSMI Thai Red Cross: Green Pit Viper Antivenin to neutralize 0.7 mg/ml of venom	30mls/3 vials Subsequent dose 6 hr
Malayan Pit Viper, <i>Calloselasma rhodostoma</i> , Green Pit Viper, <i>Cryptelytrops albolabris</i> , SEA Russell's Viper, <i>Daboia siamensis</i>	QSMI Thai Red Cross: Hemato Polyvalent Snake Antivenom	30mls/3 vials Subsequent dose 6 hr
Monocled Cobra, <i>Naja kaouthia</i> , King Cobra <i>Ophiophagus hannah</i> , Banded Krait, <i>Bungarus fasciatus</i> , Malayan Krait, <i>Bungarus candidus</i> .	QSMI Thai Red Cross: Neuro Polyvalent Snake Antivenom	50-100mls/ 5-10 vials Subsequent dose 1-2 hr
Tiger Keelback, <i>Rhabdophis tigrinus</i>	Japan Snake Institute: Tiger Keelback, <i>Rhabdophis tigrinus</i> antivenom	One vial (one additional vial if clinically indicated/available)
Beaked Sea Snake, <i>Hydrophis schistosus</i>	CSL, Australia: Sea Snake Antivenom	10-30mls/1-3 vials Subsequent dose 1-2 hr

Note:

Subsequent doses are according to the clinical symptoms. Monocled cobra, *Naja kaouthia* antivenom has good cross neutralization with the Equatorial spitting cobra, *Naja sumatrana* venom. Malayan pit viper, *Calloselasma rhodostoma*, SEA Russell's Viper, *Daboia siamensis* and Monocled cobra, *Naja kaouthia* are not indigenous to Borneo. The ViNS Indian Polyvalent antivenom is not appropriate for treating pit viper envenomations in Malaysia. It may have limited neutralizing capacity against the venoms of Equatorial spitting cobra, *Naja sumatrana*,

Monocled cobra, *Naja kaouthia*, King cobra, *Ophiophagus hannah* and Malayan krait, *Bungarus candidus*. However, its use is not recommended in Malaysia or SEA region.

Tiger keelback, *Rhabdophis tigrinus* antivenom neutralizes Red-necked keelback, *Rhabdophis subminiatus* venom in animal models and should be considered for severe Red-necked keelback, *Rhabdophis subminiatus* envenomings in humans whenever possible.

Antivenoms Appropriate for Venomous Land Snakes in Malaysia



QSMI Thai Red Cross: Cobra Antivenin to neutralize 0.6 mg/ml of venom



QSMI Thai Red Cross: King Cobra Antivenin to neutralize 0.8 mg/ml of venom



QSMI Thai Red Cross: Malayan Krait Antivenin to neutralize 0.4 mg/ml of venom



QSMI Thai Red Cross: Banded Krait Antivenin to neutralize 0.6 mg/ml of venom



QSMI Thai Red Cross: Malayan Pit Viper Antivenin to neutralize 1.6 mg/ml of venom



QSMI Thai Red Cross: Green Pit Viper Antivenin to neutralize 0.7 mg/ml of venom



QSMI Thai Red Cross: Hemato Polyvalent Snake Antivenom



QSMI Thai Red Cross: Neuro Polyvalent Snake Antivenom

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Land Snakes of Medical Significance in Malaysia

While a majority of snakes occurring in Malaysia are not equipped with venom and constitute little threat to humans, a number of species can cause envenoming that may lead to permanent disability or death. The range of snakes of medical significance in Malaysia encompasses the families Natricidae, Elapidae, Pythonidae and Viperidae. This book highlights thirty-five land snakes with short descriptions and photographs. It is intended as a guide for healthcare providers, permitting them to identify and manage potential envenoming from snakebites. The purpose of this book is also to increase public awareness on the diversity and beauty of our snakes.

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