

THE SRI LANKAN GREEN PIT VIPER and its BITES

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Craspedocephalus trigonocephalus
(= *Trimeresurus trigonocephalus* (Donndorff, 1798)) (Viperidae)
Sri Lankan Green pit viper (English), Pala polonga (Sinhala),
Patchchai viriyan (Tamil)

The arboreal, endemic, Sri Lankan Green pit viper (*Trimeresurus trigonocephalus*) is a venomous pit viper of medical importance in Sri Lanka. Pit vipers are snakes that possess a depression called a loreal pit between the eye and the nostril. The pit organ is heat sensitive and helps in locating prey. Out of the four species of pit vipers in Sri Lanka, the green pit viper is the only arboreal one. The snake's colour and markings camouflages it as it rests in trees and lush vegetation during the daytime. It is distributed in wet zone rain forests, and is also found in tea, cinnamon, and coffee plantations. It is uncommon in the dry and arid zones of the island.

Bites by the green pit viper may result in systemic envenoming that is potentially life-threatening, with no reported fatalities.

It is a stout, medium sized snake with a triangular head and a distinct neck, strikingly patterned in bright green and black. The average length of a full-grown adult snake is about 750 mm. Most of its bites are reported from tea and cinnamon estates. Tea leaf pluckers and estate workers are commonly bitten during the daytime on their hands and feet. The snake is easily identified by its characteristic colour and black markings that, however, may be absent in some. The black temporal line is constant. The other supportive identifying features are the presence of small, similar sized head scales, triangular head, and distinct neck (Figures 1 & 3).

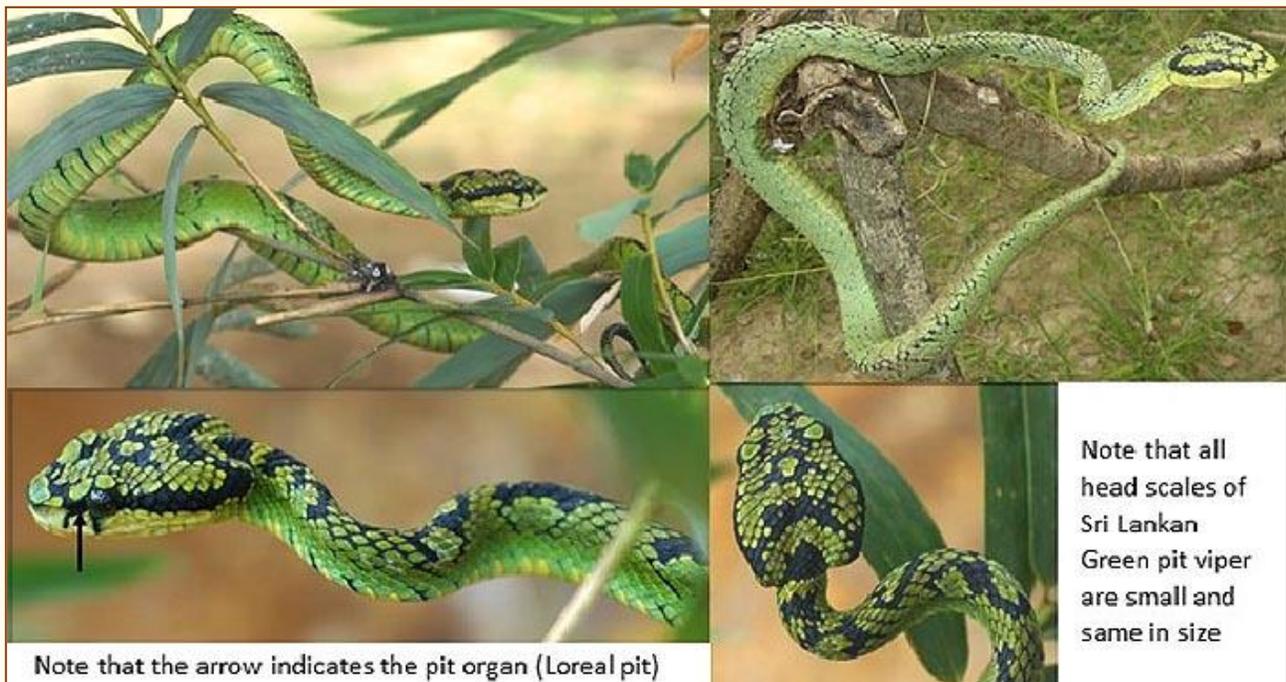


Figure 1: Sri Lankan Green pit viper

Taxonomic note by Prof. Anjana Silva: A molecular phylogenetic study of Indian and Sri Lankan green-pit vipers published on 6th October 2021 has placed Sri Lankan and Indian species that were formally recognised in the genus *Trimeresurus* in a different genus—*Craspedocephalus*. Accordingly, the correct scientific name of Sri Lankan Green-pit viper should be *Craspedocephalus trigonocephalus*. See Mallik et al, 2021.

Clinical manifestations

Green pit viper bites frequently (91-94%) cause local envenoming effects such as pain at the bite site, swelling, bleeding from the puncture wounds, regional lymphadenopathy, and haemorrhagic blistering [Figure 2] (Rathnayaka et al, 2017a and 2017b; Witharana et al, 2018). Most of these patients have severe local pain and severe swelling (Rathnayaka et al, 2017a and 2017b; Chamara et al, 2020). Systemic envenoming is rare (8-24%),

manifesting mainly as venom induced consumption coagulopathy (VICC) (Rathnayaka et al, 2017a and 2017b; Witharana et al, 2018). In addition, polyuric renal failure, ischemic electrocardiographic changes (Kularatne and Pathirage, 2005), bradycardia (Rathnayaka et al, 2017a) and ptosis (de Silva and Aloysius, 1983) have also been reported. Possible complications following envenoming include cellulitis, severe myalgia, and compartment syndrome.

Figure 2: Local envenoming effects of Sri Lankan Green pit viper bites



All photographs by Namal Rathnayaka

Recent in-vitro studies have shown that the Sri Lankan Green pit viper venom has mild procoagulant properties, the MCC5 (minimum venom concentration leading to clot formation in 5 min) being 56.43 µg/ml. This means that

compared to the MCC5 values of other Sri Lankan viperid snake venoms, a large dose of venom is required for the development of VICC following green pit viper envenoming (Nikapitiya et al, 2018).

Management of Green pit viper bites

- * Confirm the identity of the snake from the patient's history; if the offending snake is not brought to the hospital, show a photograph.
- * Elevate the bitten limb.
- * Perform 20 min WBCT on admission and repeat 6 hourly for 24 hrs; or if the 20 min WBCT is positive (> 20 min) persistently, continue for 48 hrs.
- * Manage coagulopathy (confirmed with WBCT20 and or PT/INR) with fresh frozen plasma (FFP) – 2 packs twice a day for 2 days (or 10 ml/kg/day).
- * Monitor blood pressure, pulse, and urine output.
- * If local swelling is extensive and spreading, monitor the distal pulse, capillary refilling time and SpO2 of the affected limb in order to detect the onset of compartment syndrome. If compartment syndrome develops, consult the surgical team for consideration of fasciotomy.
- * Maintain a fluid balance chart. Fluid intake should be 100 ml/hr IV or oral; if the urine output is reduced (less than 0.5 ml/kg/hr) give IV frusemide in 20 mg boluses and obtain a nephrologist's opinion.
- * Pain management: paracetamol 1 g x 6 hourly for relief of mild to moderate pain or, if severe, tramadol 50 mg twice daily may be administered.
- * Perform wound toilet and dressings for wounds as required.
- * The following investigations are recommended:
 - FBC with blood picture
 - PT/INR, aPTT
 - Serum creatinine, blood urea, serum electrolytes
 - ECG
- * If persistent fever with elevated WBC count and CRP or if severe extensive local swelling associated with cellulitis, consider intravenous antibiotics such as: **(See below)**
 - IV cloxacillin 500 mg x 6 hourly and co-amoxiclav 1.2 g x 8 hourly or
 - IV clindamycin 300 mg x 8 hourly.
- * Administer tetanus toxoid when the patient is discharged.
- * Avoid potassium containing fruits and oily food during the hospital stay.

CAUTION: Antibiotics should be used only if there is evidence of secondary bacterial infection. Elevated WBC occurs even without sepsis as a systemic reaction to envenoming. Local swelling is usually due to chemical inflammation and not sepsis, which often results from inappropriate first aid such as incising the bite site.

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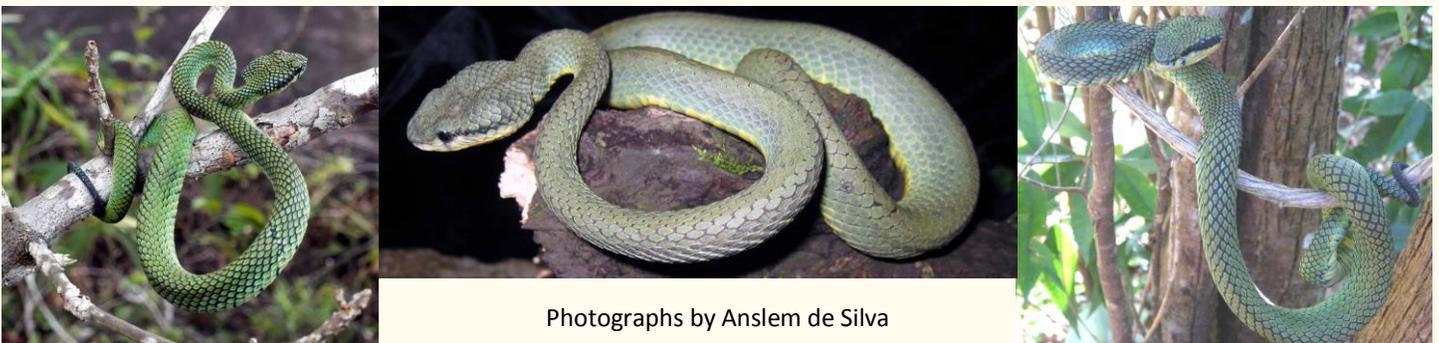
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Figure 3: Uncommon unicolor Green pit vipers. The black temporal line is always present.



Photographs by Anslem de Silva

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