

Biodiversity Between Land and the Sea



Life from Headwaters to the Coast

BAKO

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BORNEAN KEELED PIT-VIPER

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The Bornean Keeled Pit-viper (*Tropidolaemus subannulatus*) is a strictly arboreal, venomous snake that is commonly encountered in Bako National Park. It possesses a heat-sensitive pit behind the nostrils, the source of its English common name. The species is widespread across many of the major islands of south-east Asia, including Borneo (Kalimantan, Indonesia; Labuan, Sarawak and Sabah, Malaysia and Brunei Darussalam), and the southern parts of the Philippines. Besides Bako, the species can be seen along the sandstone hills of Kubah National Park and Gunung Santubong National Park, Lambir Hills National Park, Ranchan Pool forests of Serian, Gunung Penrissen, the alluvial forests of Gunung Mulu National Park, the limestone hills of Bau, the peat swamps of Kota Samarahan, and many other localities across Borneo.

Characteristics of the species include a flat-topped and steep-sided head, in addition to its distinctive triangular shape, the rear of head wider than the neck, the forehead scales keeled, the tail prehensile or capable of gripping small branches and other objects and extreme dimorphism or differences



Fig. 1. Adult female (left) and male (right) Bornean Keeled Pit-viper.

BORNEAN GREEN PIT-VIPER

between adult male and female. Similar to nearly all pit-vipers, this species is ovoviviparous, whereby eggs hatch within the mother's body. As juveniles, males and females are similar in morphology and colouration, both having a slender body, and therefore hard to distinguish. With growth, males and females become sexually dimorphic as well as dichromatic: males are relatively more slender, whereas adult females become heavy-bodied, longer and heavier, reaching up to 1 meter in length. Females also show greater variation in colouration: some are vellow-green, with bluish crossbands, while other turn blueblack, with small yellowish green dots arranged in a pattern forming crossbands. This contrasts with adult males which show a pale green ground colour, with rows of bright red spots on each side of the flanks; these spots either fade with growth or turn blue. The bright green and red colouration helps them blend with their leafy habitat,



Fig. 2. A large female climbing vegetation.

critical for an ambush predator, and also presumably in escaping predators. Another interesting adaptation shown by many green pit-vipers is a bright tail-tip, thought to be used as a lure to attract prey.

Being associated with trees and other forest vegetation, the Bornean Keeled Pit-viper is a species of lowland dipterocarp forests. Movements are more typically vertical, some ascending tree canopies and adults are known to move between 3–4 adjacent trees whose canopies are linked. They typically show limited movement, remaining in one spot for days and even weeks, as expected of a sit-and-wait predator. Adults feed on small birds and mammals, while juveniles take lizards and frogs. One field observation was of a snake at

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a tree canopy lunging at flying bats! Vipers, in general, are known to swallow prey 56% of their body mass, relatively the largest prey swallowed by any snake, whereas the largest prey devoured by non-viper is only about half of this.

Vipers can complete a strike under a second. They can lunge from a resting position, erect the fangs, inject venom into their prey and return to their original position within the blink of an eye. The prominent fangs are particularly long, comprising hollow teeth that rotate through remarkable angles. While there are a number of records of bites by this species, no fatalities have been recorded. Nonetheless, the species needs to be treated with caution, as its venom contains haemotoxin that can damage red blood cells, in addition to a mixture of procoagulants that may have anticoagulants and/or haemorrhagic properties.

In Bako National Park, the Bornean Keeled Pit-viper is commonly encountered near the jetty, and provides tourists with a photographic opportunity.



Fig. 3. An adult about to strike.