SYSTEMATICS, VENOM CHARACTERISTICS AND CLINICAL FEATURES OF ENVENOMING BY SRI LANKAN HUMP-NOSED PIT VIPERS

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ABSTRACT

Hump-nosed pit vipers of the genus *Hypnale* are of substantial medical importance in Sri Lanka and India, being included among the five snakes most frequently associated with life-threatening envenoming in humans. The genus has hitherto been considered to comprise three species: *H. hypnale,* common to Sri Lanka and the Western Ghats of peninsular India; and *H. nepa* and *H. walli,* both endemic to Sri Lanka.

After reviewing all extant name-bearing types in the genus, supplemented by examination of preserved specimens, I show that *H. nepa* is restricted to the higher elevations of Sri Lanka's central mountains; *H. walli* is a junior synonym of *H. nepa*; and that the endemic species widely distributed in the Island's south-western 'wet-zone' lowlands is *H. zara.* I also draw attention to a possibility of a new species known only from a single specimen collected near Galle in southern Sri Lanka.

Reverse Phase High Performance Liquid Chromatography (*RP*-HPLC) and Sodium Dodecyl Sulphate Polyacrylamide Gel Electrophoresis (SDS-PAGE) results demostrate that three species of hump nosed pit vipers share common proteins in their venom.

In-vitro cytotoxicity studies demonstrated the presence of cytotoxicity for all three *Hypnale* venoms and that they had similar cytotoxic potency. In-vitro neurotoxicity and

myotoxicity experiments show the presence of weak neurotoxicity and myotoxicty in all three Sri Lankan *Hypnale.*

In vitro coagulation experiments show the presence of procoagulant activity in all three *Hypnale*, with similar minimum clotting concentrations 5 (MCC_5). Presence of phospholipases A_2 activity was also shown in all three hump-nosed pit vipers .

Hump nosed pit vipers were a common cause of snake bite in the country with varying clinical consequences ranging from local effects to few cases of coagulopathy and acute renal failure with few recorded fatalities. This study shows coagulopathy, acute renal failure and varying degree of local effects following *Hypnale hypnale* envenoming while *H. nepa, H. zara* envenoming caused only local effects and non specific systemic envenoming without any evidence of specific systemic involvement such as coagulopathy or nephropathy.

Even though *H. nepa* and *H. zara* did not show any hospital-based evidence of specific systemic envenoming such as coagulopathy or nephropathy, their venoms consist of similar proteins to those in *H. hypnale* venom. Therefore, similar clinical effects of *H. nepa* and *H. zara* to *H. hypnale* may be expected. It is important to consider all three *Hypnale* species in a same category of medically important snakes in Sri Lanka.