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Snake-eating Serpents: Krait and Cobra Predation on the Medically Important Russell's Vipers in South Asia

DANIEL HENRIK JESTRZEMSKI¹, ULRICH KUCH², VISHAL SANTRA³

¹*Georg-August-Universität Göttingen, Faculty of Forest Sciences and Forest Ecology, Germany*

²*Goethe University Frankfurt, Institute for Occupational, Social and Environmental Medicine, Health Sciences Centre,*

³*Simultala Conservationists, Foundation for Wildlife,*

Abstract

In South and Southeast Asia, where snakebite is recognised as a particularly serious public health problem, Russell's vipers (*Daboia russelii* and *Daboia siamensis*, Viperidae family) are the snake species that cause the most complicated and severe envenoming syndromes, and most human fatalities. They contribute significantly to the 46,000 deaths per year from snakebite in India alone. These medium to large-sized vipers (up to 180 cm total length) prey on rodents and are consequently invading agricultural areas. Despite the importance of Russell's vipers as natural pest control in agriculture, many people are bitten by them during work in rice paddy fields. Other common snake species in this agro-forestry environment are kraits (*Bungarus* spp.) and cobras (*Naja* spp.), both being in the Elapidae family and highly venomous as well. The Indian cobra (*Naja naja*) is one of the most widely distributed cobra species in South and Southeast Asia. These large elapids (up to 230 cm body length) are both diurnally and nocturnally active and be found in various habitats, particularly in rice paddies and nearby human settlements where they prey on rats, mice and other small vertebrates. Kraits are medium to large-sized (up to 225 cm body length), nocturnal elapids and primarily feed on other snakes. While kraits and cobras cause fatal envenomations across their distribution range, they feed on other snakes, including venomous species, and hence may benefit rural farmers working in areas with high risk of snakebite. However, trophic interactions between kraits, cobras and Russell's vipers have not been scientifically investigated so far. Via searches in online databases, we have recorded six cases of krait and five cases of cobra predation upon Russell's vipers in India, Sri Lanka and Myanmar, most of which took place between 2013 and 2016. We conclude that the ecological importance of elapid predation on deadly venomous and widely distributed viper species such as *D. russelii* requires a closer investigation, as well as its implications for tropical agro-ecosystems and potential benefits for rural communities.

Keywords: Agricultural ecosystems, cobras, kraits, Russell's vipers, snakebite, south Asia, trophic interactions