

SHORT COMMUNICATION

Keratophagy in captive *Bothrops moojeni* (Serpentes: Viperidae)

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Keywords: diet, feeding behavior, keratophagic behavior, shed skin, snake.

Palavras-chave: comportamento alimentar, comportamento queratofágico, dieta, muda de pele, serpente.

Keratophagy, the act of an organism ingesting its own shed skin (Groves and Groves 1972), is observed in several lizard species, but rarely reported in snakes (Mitchell *et al.* 2006). There are only 19 reports of keratophagy in snakes (Mitchell *et al.* 2006). All but one of these occurred in captivity (Beebe 1946, Shipkowski 1980, O'Shea and Bigilale 1991, Russell 1999; see also Mitchell *et al.* 2006 and references therein). In most cases, the behavior was observed in species that normally include reptiles in their diet (but see Shipkowski 1980, Haagner 1991, Hallmen 1998). Thus, it has been proposed that ophidian keratophagy may be linked to disruptions of normal feeding habits in captivity (Groves and Groves 1972).

Herein, we report four cases of keratophagy observed in three different, captive Brazilian Lanceheads, *Bothrops moojeni* (Hoge, 1966). The snakes were housed individually in wood cages (26 × 27 × 24 cm) inside a temperature-controlled room (26 ± 2°C) at Universidade Estadual Paulista Júlio de Mesquita Filho (UNESP), Rio Claro municipality, São Paulo

state in southeastern Brazil. The animals had free access to water and were fed once a month with live rodents.

On June 2013, while a freshly shed skin was being removed from the snake's cage with forceps, a juvenile female (total length ~ 60 cm; ~ 70 g) struck the skin and swallowed it completely within 15 min. On 25 February 2015, the same individual (ca. 85 cm and 151.4 g) ingested its own shed skin within 10 min (Figure 1). In both cases, this snake was fed approximately 20 days before the observation of the keratophagic behavior. Our report seems to be the first to identify the same individual repeating the keratophagic behavior (Mitchell *et al.* 2006).

On 20 February 2015, another female *Bothrops moojeni* (total length ~ 100 cm; 291.65 g) struck and swallowed its own sloughed skin. However, we intentionally moved the skin in front of the snake's head in an attempt to elicit the keratophagic behavior. This snake had fed 15 days before the observation, but the mouse meal was regurgitated in the following day. Thus, the last successfully digested meal for this individual was approximately 45 days prior the occurrence of keratophagy.

On 6 August 2015, we observed an adult male *Bothrops moojeni* (total length ~ 970 cm; ~

Received 27 April 2016
Accepted 25 August 2016
Distributed December 2016

265.0 g) strike its own shed skin while being removed from the its cage; this is similar to our first observation described above. The shed skin was broken into two pieces. One part (about two thirds of the shed total length) was ingested by the snake within about 10 min. This snake had been fed nine days earlier.

Bothrops moojeni is a viperid snake found at the Cerrado domain in central and southeastern Brazil (Wüster *et al.* 1996). Its feeding habits change ontogenetically; the young mainly consume small anurans and reptiles, whereas the adults feed on small mammals and birds (Martins *et al.* 2002, Nogueira *et al.* 2003). However, adults *B. moojeni* are known to prey on lizards and snakes occasionally (Nogueira *et al.* 2003). Our observations support the notion that keratophagy is an abnormal behavior that most likely is induced by captivity in species that naturally include reptilian prey in their diet (Mitchell *et al.* 2006; but see Shipkowski 1980, Haagner 1991, Hallmen 1998).

The factors that promote keratophagy in captive snakes are unknown. Perhaps, shed skins, especially when associated with motion, provide trigger to the behavioral repertoire associated with prey capture and ingestion in those species that naturally recognize reptiles as potential prey items. It is also possible that hunger following fasting may contribute to the occurrence of keratophagy in captive snakes.

Acknowledgments.—Financial support was provided by FAPESP and CNPQ, and IBAMA provided the license to collect the snakes and maintain them in captivity (process number 22028-1). We also wish to thank Dr. Linda Trueb and anonymous reviewers for their helpful comments on our manuscript. 🐍

References

Beebe, W. 1946. Field notes on the snakes of Kartabo, British Guiana, and Caripito, Venezuela. *Zoologica* 31: 11–52.

Groves, F. and J. D. Groves. 1972. Keratophagy in snakes. *Herpetologica* 28: 45–46.



Figure 1. A captive female *Bothrops moojeni* ingesting its own skin shed in Rio Claro municipality, São Paulo state, southeastern Brazil.

Haagner, G. 1991. Keratophagous behaviour in two Southern African snakes. *Naturalist* 35: 32–33.

Hallmen, M. 1998. Ein Fall von Keratophagie bei der gewöhnlichen Strumpfbandnatter, *Thamnophis sirtalis sirtalis*. *Elaphe* 6: 74–75.

Martins, M., O. A. V. Marques, and I. Sazima. 2002. Ecological and phylogenetic correlates of feeding habits in Neotropical pitvipers of the genus *Bothrops*. Pp. 307–328 in G. W. Schuett, M. Höggren, M. E. Douglas, and H. W. Greene (eds.), *Biology of the Vipers*. Eagle Mountain. Eagle Mountain Publishing.

Mitchell, J. C., J. D. Groves, and S. C. Walls. 2006. Keratophagy in reptiles: review, hypotheses, and recommendations. *South American Journal of Herpetology* 1: 42–53.

Nogueira, C., R. J. Sawaya, and M. Martins. 2003. Ecology of the Pitviper, *Bothrops moojeni*, in the Brazilian Cerrado. *Journal of Herpetology* 37: 653–659.

O’Shea, M. T. and I. Bigilale. 1991. *Bothrochilus papuanus* (Papuan olive python), Keratophagy. *Herpetological Review* 22: 60.

Russell, M. J. 1999. Natural history: *Bitis nasicornis* (Rhinceros viper), dermatophagy. *Herpetological Review* 30: 99.

Shipkowski, R. 1980. Ingestion of a shed skin *Python molurus bivittatus*. *Notes from NOAH* 7: 8.

Wüster, W., R. S. Thorpe, and G. Porto. 1996. Systematics of the *Bothrops atrox* complex (Reptilia: Serpentes: Viperidae) in Brazil: a multivariate analysis. *Herpetologica* 52: 263–271.

Editor: Jaime Bertoluci