



Scientific note

**Predation of *Elapomorphus quinquelineatus* (Serpentes: Dipsadidae)  
by *Micrastur semitorquatus* (Aves: Falconidae)**

Vanessa Nocelli<sup>1\*</sup> , Lúcio Moreira Campos Lima<sup>2</sup>  & Henrique Caldeira Costa<sup>1,2</sup> 

*Elapomorphus quinquelineatus* (Raddi, 1820) is a fossorial snake endemic to the Atlantic Rainforest of southeastern to southern Brazil (Nogueira *et al.* 2019). It has cathemeral habits and is found even in disturbed habitats (Costa *et al.* 2010). *Elapomorphus quinquelineatus* is commonly found moving above the ground, although it also has fossorial habits (Hartmann *et al.* 2009; Costa *et al.* 2010), relying on crypsis to avoid predation (Martins *et al.* 2008), and may use cloacal discharge and erratic movements if handled (Marques *et al.* 2019). This rear-fanged snake is not known to bite as a defense, although having a highly hemorrhagic venom (Salomão *et al.* 2003). In this study, we report a specimen of *E. quinquelineatus* preyed by a *Micrastur semitorquatus* (Vieillot, 1817) (Falconidae), popularly known as Collared Forest-Falcon, and reviewed records of predation on the species.

Between 8 and 9 a.m. on 10 November 2020, one of us (LL) was driving on a dirt road in Reserva Particular do Patrimônio Natural Chapadão da Serra Negra (21.9634°S, 43.8014°W), a private protected area of Atlantic Forest in Santa Bárbara do Monte Verde, Minas Gerais, southeastern Brazil. LL saw a Collared Forest-Falcon (*M. semitorquatus*), approximately 50 meters from his car, and stopped

the vehicle to observe the raptor. The falcon held a snake with its claws over the sandy soil, flapping the wings to balance and stroke the snake head three to five times with its beak. After about 30 seconds of observation, the falcon flew into the woods, leaving its prey. The snake (female, 685 mm snout-vent length and 67 mm tail length) was bleeding through its mouth and showed only tail reflection movements. After stating that the snake was dead, LL collected it (ICMBio, 2014 [art. 25]), fixed in 10% formalin and preserved in 70% ethanol at the reptile collection of Universidade Federal de Juiz de Fora (catalog number CHUFJF 2209) (Figure 1).

The Collared Forest-Falcon inhabits Neotropical primary and secondary forests from southern United States to northern Argentina (Bierregaard, 1994; Ferguson-Lees & Christie, 2001). Despite its wide geographic range, there are few studies about its food habits, and its diet is based mainly on birds, mammals and reptiles (Thorstrom, 2000; Thorstrom *et al.* 2000; Thorstrom, 2001; Thorstrom *et al.* 2001; Viana *et al.* 2012).

To search for previous predation records of *Elapomorphus quinquelineatus*, we revised the literature on “Google Scholar” database, using the following keywords in Portuguese, English, and

<sup>1</sup> Instituto de Ciências Biológicas, Universidade Federal de Juiz de Fora. CEP 36036-900, Juiz de Fora, Minas Gerais, Brasil.

<sup>2</sup> Programa de Pós-Graduação em Biodiversidade e Conservação da Natureza, Universidade Federal de Juiz de Fora. CEP 36036-900, Juiz de Fora, Minas Gerais, Brasil.

\* Corresponding author: nocelli.vanessa@gmail.com

Spanish on 10 May 2022: predação OR presa OR predador OR depredación OR predación OR depredador OR predation OR prey OR predator OR diet OR dieta AND “*Elapomorphus quinquelineatus*”. The search returned 84 results, but only two were relevant for this study (Palmuti *et al.* 2009; Silva, 2014), none citing *Micrastur semitorquatus* as the predator. On 31 May 2022 we did a search in the WikiAves citizen science website (<https://www.wikiaves.com.br/>) for records of *M. semitorquatus* feeding or preying, resulting in 42 pictures. However, only two showed a snake as prey (Kassis, 2015; Messias, 2015), both from the same predation event. On 06 June 2022 we reviewed all editions of the journal Herpetological Review (1967–2022), which traditionally publishes natural history notes not always tracked by Google Scholar, but no records were found. We also reviewed the supplementary material from Souza *et al.* 2022, finding only one record.

Until now, *E. quinquelineatus* had been reported as prey only to other snakes, the rear-fanged false coral-snake *Erythrolamprus aesculapii* (Palmuti *et al.* 2009) and the front-fanged coral-snake *Micrurus frontalis* (Silva, 2014). This is the first record of *E. quinquelineatus* preyed by a bird. Additionally, for the best of our knowledge, our search revealed this is only the second record of a snake being preyed by *M. semitorquatus* (Souza *et al.* 2022).

Despite its wide geographic range, *M. semitorquatus* is not well known regarding its natural history. The same is true for *E. quinquelineatus*, which has a narrower range and a mostly fossorial lifestyle. Prey-predator reports like this are essential to fill basic gaps in our knowledge of biodiversity, which can later become the basis for wider studies (e.g., Schalk & Cove, 2018; Souza *et al.* 2022).



**Figure 1.** Female specimen of *Elapomorphus quinquelineatus* (CHUFJF 2209; 685 mm snout-vent length, 67 mm tail length) killed by a Collared Forest-Falcon (*Micrastur semitorquatus*) on 10 November 2020 in Reserva Particular do Patrimônio Natural Chapadão da Serra Negra, Atlantic Forest of southeastern Brazil. Scale bar: 10 mm. Photo: Lucas Morgado.

#### ACKNOWLEDGMENTS

We would like to thank two anonymous referees and the editor for valuable comments in a first version of this paper.

#### REFERENCES

- Bierregaard, R.O. (1994) Collared Forest-falcon *Micrastur semitorquatus*. In: Hoyo, J., Elliot, J., & Sargatal, J. (Eds.), *Handbook of the birds of the World: New World Vultures to Guinea fowl*. Second edition. Lynx Editions, 254 pp.
- Costa, H.C., Guedes, T.B. & Bérnills, R.S. (2022) Lista de Répteis do Brasil: padrões e tendências. *Herpetologia Brasileira* 10: 110–279.  
<https://doi.org/10.5281/zenodo.5838950>
- Costa, H.C., Pantoja, D.L., Pontes, J.L. & Feio, R.N. (2010) Snakes of the Municipality of Viçosa, Atlantic Forest of Southeastern Brazil. *Biota Neotropica* 10: 353–377.  
<https://doi.org/10.1590/S1676-06032010000300033>
- Ferguson-Lees, J. & Christie, D.A. (2001) *Raptors of the world*. Houghton Mifflin Harcourt. 992 pp.
- Hartmann, P.A., Hartmann, M.T., & Martins, M. (2009) Ecology and natural history of a snake assemblage at Núcleo Santa Virgínia, Parque Estadual da Serra do

- Mar, southeastern Brazil. *Biota Neotropica* 9: 173-184. <https://doi.org/10.1590/S1676-06032009000300018>
- ICMBio. Instituto Chico Mendes de Conservação da Biodiversidade. (2014) Instrução Normativa Nº 03, de 01 de Setembro de 2014. Diário Oficial da União 168(1): 60-62.
- Kassis, A. (2015) WA1984906 *Micrastur semitorquatus* (Vieillot, 1817). Wiki Aves - A Enciclopédia das Aves do Brasil. Available from: <http://www.wikiaves.com/1984906> (accessed: 27 Junho 2022).
- Martins, M., Marques, O.A.V. & Sazima, I. (2008) How to be arboreal and diurnal and still stay alive: microhabitat use, time of activity, and defense in neotropical forest snakes. *South American Journal of Herpetology* 3(1): 58-67. [https://doi.org/10.2994/1808-9798\(2008\)3\[58:HTBAAD\]2.0.CO;2](https://doi.org/10.2994/1808-9798(2008)3[58:HTBAAD]2.0.CO;2)
- Marques, O.A.V., Eterovic, A. & Sazima, I. (2019) *Serpentes da Mata Atlântica: guia ilustrado para as regiões costeiras do Brasil*. Ponto A, Cotia, 319 pp.
- Messias, S.M. (2015) WA2027105, *Micrastur semitorquatus* (Vieillot, 1817). Wiki Aves - A Enciclopédia das Aves do Brasil. Available from: <http://www.wikiaves.com/2027105> (accessed: 27 Jun 2022).
- Palmuti, C.F.S., Cassimiro, J. & Bertoluci, J. (2009) Food habits of snakes from the RPPN Feliciano Miguel Abdala, an Atlantic Forest fragment of southeastern Brazil. *Biota Neotropica* 9(1). <https://doi.org/10.1590/S1676-06032009000100028>
- Salomão, M.G., Albolea, A.B.P. & Almeida-Santos, S.M. (2003) Colubrid Snakebite: A Public Health Problem in Brazil. *Herpetological Review* 34: 307-312.
- Silva, C.C.A. (2014) *História Natural e Análise Citogenética de Micrurus Frontalis (Duméril, Bibron & Duméril, 1854) (Serpentes: Elapidae)*. Universidade Federal de Viçosa, Viçosa, 69 pp. Available from: <https://locus.ufv.br//handle/123456789/2287> (accessed: 27 Jun 2022).
- Souza, E., Lima-Santos, J., Entiauspe-Neto, O.M., Santos, M.M., Moura, P.R. & Hingst-Zaher, E. (2022) Ophiophagy in Brazilian birds: a contribution from a collaborative platform of citizen science. *Ornithology Research* 30:15-24. <https://doi.org/10.1007/s43388-022-00082-5>
- Schalk, C.M. & Cove, M.V. (2018) Squamates as prey: Predator diversity patterns and predator-prey size relationships. *Food Webs* 17: Article e00103. <https://doi.org/10.1016/j.fooweb.2018.e00103>
- Thorstrom, R. (2000) The food habits of sympatric forest-falcons during the breeding season in northeastern Guatemala. *Journal of Raptor Research* 34(3): 196-202.
- Thorstrom, R., Ramos, J.D. & Castillo, J.M. (2000) Breeding biology and behavior of the Collared Forest-falcon (*Micrastur semitorquatus*) in Guatemala. *Ornitologia Neotropical* 11(1): 1-12.
- Thorstrom, R. (2001) Nest-site characteristics and breeding density of two sympatric forest-falcons in Guatemala. *Ornitologia Neotropical* 12: 337-343.
- Thorstrom, R., Morales, C.M. & Ramos, J.D. (2001) Fidelity to territory, nest site and mate, survivor ship, and reproduction of two sympatric forest - falcons. *Journal of Raptor Research* 35: 98-106.
- Viana, I.R., Silva, T.D., & Zocche, J.J. (2012) Nidificação de *Micrastur semitorquatus* Vieillot, 1817 (Falconiformes: Falconidae) no interior de uma habitação humana urbana no sul de Santa Catarina, Brasil. *Revista Brasileira de Biociências* 10: 171-175.

Received: 05/07/2022

Accepted: 27/10/2022

Published: 09/11/2022



This is an open-access article distributed under the terms of the Creative Commons Attribution License.