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Cuad. herpetol. 39 (1): 55-58 (*2025)*

Stretched up in a tree a knot down in our hands: first record of climbing and defensive habits of *Trilepida salgueiroi* (Amaral, 1955) (Serpentes, Leptotyphlopidae)

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Recibida: 25 Abril 2025
Revisada: 12 Mayo 2025
Aceptada: 23 Mayo 2025
Editor Asociado: S. Quinzio

doi: 10.31017/CdH.2025.(2025-017)

ABSTRACT

Threadsnakes are typical burrowers with specialised diet in social insects. Climbing behaviour has been observed for some of these species although there is no consensus about the nature of such behaviour for fossorial species. In this study we describe the first climbing behaviour for *Trilepida salgueiroi* in an occasional observation together with the description of the sequence of defensive behaviours displayed during its capture.

Key Words: Threadsnake; Fossorial snake; Natural history; Behaviour.

Describing defensive mechanisms may provide insights on evolutionary trends of predator/prey relationships and defensive character selection pressures (Greene, 1983). Squamates have diverse anti-predator mechanisms and many behavioural displays in order to avoid predators (Greene, 1973; Tozetti *et al*., 2009; Pough *et al*., 2016) and among them, snake tactics are apparently well documented (Greene, 1988). Nonetheless, some groups and species of snakes are underrepresented in such records, as is the case for 'scolecophidians', traditionally known as threadsnakes, blindsnakes and wormsnakes. Most representatives of this group are specialised burrowers and their diet is composed of larvae or adults of social insects (Greene, 1997; Cundall and Greene, 2000; Webb *et al*., 2000). Due to these secretive habits and small size they are difficult to encounter and only few contributions on its ecology, systematic, morphology and natural history, including defensive behaviour, are available (Adalsteinsson *et al*., 2009; Greene, 1997; Wallach, 2016). Threadsnakes` defensive mechanisms include cloacal sac discharge, silvery colouration, death-feigning and erratic movements, defecation, writhing, and vigorous semirigid serpentine behaviours (Richmond, 1955; Visser, 1966; Gehlbach *et al*., 1968; Watkins *et al*., 1969; Gehlbach, 1970, Martins *et al*. 2018). Particularly, individuals of the Leptotyphlopidae family have only few observations and information on its natural history and behaviour is considered incipient (Avila *et al*., 2006). This is greatly exemplified by the fact that the first description of defensive repertoire of *Trilepida* spp. was for *Trilepida jani* recently described by Martins *et al*., (2018).

Even though scolecophidians are known for their fossorial or ground-dwelling lifestyles, a few records of climbing behaviour have accumulated in the past decades for representatives of the group.

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For instance, climbing and arboreal behaviour in blindsnakes representatives have been previously reported for typhlopoids as *Anilios* (Chappman and Dell, 1975; Shine and Webb, 1990), *Antillothyphlops* (Tolson and Campbell, 1989), *Gerrhopilus* (Kraus, 2017) *Indotyphlops* (Das and Wallach, 1998; Bazzano, 2007), *Medatyphlops* (Glaw and Vences, 1994), *Ramphotyphlops* (Taylor, 1922; Gaulke, 1995), and *Typhlops* (Landestoy, 2023). For leptotyphlopids, fewer records have been provided for *Epictia* (Mole, 1924; Schmidt and Walker, 1943; Vanzolini, 1970; Fraga and Carvalho, 2020), *Myriopholis* (Minton, 1966), *Rena* (Gehelbach and Baldbridge, 1987; Repp, 2019), *Mitophis* (Landestoy, 2023) and *Trilepida* (Dunn, 1944).

The genus *Trilepida* currently contains 15 recognized species distributed throughout South America (Uetz *et al.*, 2024) that typically exhibit fossorial habits, as expected for the family (Pinto and Curcio, 2011). Within the genus, records of climbing activity have only been reported for an individual of *T. macrolepis* found in a vertical concrete wall at 0.6 m height in Colombia (Dunn, 1944). Herein we provide the first record of climbing behaviour for *Trilepida salgueiroi*. This species is endemic to Brazil, distributed in Atlantic Forest lowland in the states of Bahia, Espirito Santo, Minas Gerais and Rio de Janeiro (Nogueira *et al.*, 2020). In addition, we describe the defensive repertoire of the species during capture and manipulation.

We spotted a male specimen of *Trilepida salgueiroi* (MNRJ28050) measuring 320 mm of CRC on a tree trunk climbing a completely vertical surface through grooves in the bark at 20:10 pm on the 3th September 2023. The behaviour was observed in Niterói municipality, Rio de Janeiro, Brazil (-22.953, -43.019) inside lowland dense ombrophilous forest. The specimen was found about 1.8 meters above the ground and rose even higher while we were filming and photographing the specimen. The specimen was

Figure 1. *Trilepida salgueiroi* displaying climbing behaviour in tree, using the bark grooves to sustain its body in vertical surface.

using the bark grooves to maintain the body in the tree (Fig. 1). At one point we captured the specimen that immediately displayed cloacal discharge and erratic movements as defensive behaviour. On a second manipulation for photography, the specimen tried to escape and when handled started prodding with the tail spine. The animal was then transferred to Setor de Herpetologia, Departamento de Vertebrados, Museu Nacional do Rio de Janeiro/UFRJ. When it was handled for another photo session the specimen exhibited the defensive behaviour known as coiling, where the individual wrapped itself around its own body forming a kind of "knotted ball" (Fig. 2). In addition, the specimen once again displayed cloacal discharge and prodding with its caudal spine.

Climbing and arboreal behaviour in threadsnakes raise the discussion about ecological and evolutionary history of climbing habits in the group. Authors have suggested that the behaviour could be related to foraging and feeding habits, expanding range, following pheromone trails of conspecifics of the opposite sex or broadening of ecological niche (Das and Wallach, 1998; Repp, 2019). Either way, the habit may be more common than believed to be among threadsnakes, and must be further explored and studied. In the case described above, no feeding was observed neither specific movement patterns was detected.

Figure 2. *Trilepida salgueiroi* showing the defensive behaviour of coiling when handled before the photo shoot.

The defensive behaviour reported here is known for many species of threadnsakes and blindsnakes. Balling is a common behaviour in Anomalepididae, Leptotyphlopidae and Typhlopidae (Tozetti *et al*., 2021; Martins *et al*., 2018) as well as prodding with tail and cloacal discharge (Martins *et al*., 2018). However, this is the first report of a defensive behaviour for *Trilepida salgueiroi*. The species is a secretive snake with little information on its natural history. This study contributes for the species biology knowledge, providing new data on its behaviour. We also emphasise that studies concerning habitat use of 'scelocophidians' is essential to better understand climbing events documented for individuals of this group.

Acknowledgments

We thank Instituto Estadual do Ambiente - INEA for the collection permits (INEA #090/2023). We also thank Luis Fernando Carmo for the help in field and information concerning size and sex of the specimen.

Competing interests

The authors declare that they have no conflict of interest

Literature cited

Adalsteinsson, S.A.; Branch, W.R.; Trape, S.; Vitt, L.J. & Hedges, S.B. 2009. Molecular phylogeny, classification, and biogeography of snakes of the Family Leptotyphlopidae (Reptilia, Squamata). *Zootaxa* 2244: 1-50.

Avila, R.W.; Ferreira, V.L. & Souza, V.B. 2006. Biology of the blindsnake *Typhlops brongersmianus* (Typhlopidae) in a semideciduous forest from central Brazil. *Herpetological Journal* 16: 403–405.

Bazzano J. 2007. Herpetological inventory in West Hawaii National Parks: Puuhonua o Hōnaunau National Historical Park, Kaloko-Honokōhau National Historical Park, PuUkoholā Heiau National Historic Site. Pacific Cooperative Studies Unit, University of Hawaii at Manoa, Department of Botany.

Cundall, D. & Greene, H.W. 2000. Feeding in snakes, *in*: Schwenk K. (ed.), *Feeding, Form, Function, and Evolution in Tetrapod Vertebrates*, San Diego, pp. 293-333.

Das, I. & Wallach, V. 1998. Scolecophidian arboreality revisited. *Herpetological Review* 29: 15-16.

De Fraga, R. & De Carvalho, V.T. 2022. Testing the Wallace's riverine barrier hypothesis based on frog and Squamata reptile assemblages from a tributary of the lower Amazon River. *Studies on Neotropical Fauna and Environment* 57: 322-331.

Dunn, E.R. 1944. A review of the Colombian snakes of the families Typhlopidae and Leptotyphlopidae. *Caldasia* 3: 47-55.

Gaulke M. 1995. Observations on arboreality in a Philippine blind snake. *Asiatic Herpetological Research* 6: 45-48

Gehlbach, F.R. 1970: Death-feigning and erratic behavior in Leptotyphlopid, Colubrid and Elapid Snakes. *Herpetologica* 26: 24-34.

Gehlbach, F.R. & Baldridge, R.S. 1987. Live blind snakes (*Leptotyphlops dulcis*) in eastern screech owl (*Otus asio*) nests: a novel commensalism. *Oecologia* 71: 560-563.

Gehlbach, F.R.; Watkins II, J. & Reno, H.W. 1968. Defensive behavior elicited by ant attacks, *Bioscience* 18: 784-785.

Glaw, F. & Vences, M. 1994. A fieldguide to the amphibians and reptiles of Madagascar (2nd ed.). Cologne: Vences & Glaw Verlag, Köln, 480 pp.

Greene, H.W. 1973. Defensive tail display by snakes and amphisbaenians. *Journal of Herpetology* 7: 143-161.

Greene, H. W. 1983. Dietary correlates of the origin and radiation of snakes. *American Zoologist* 23: 431-441.

Greene, H. W. 1988. Antipredator mechanisms in reptiles, i*n*: C. Gans and R.B. Huey (eds.), *Biology of the Reptilia*, New York, John Wiley and Sons, pp. 1-152.

Greene, H.W. 1997. Snakes: The Evolution of Mystery in Nature. Berkeley and Los Angeles, University of California Press.

Kraus, F. 2017. New species of blindsnakes (Squamata: Gerrhopilidae) from the offshore islands of Papua New Guinea. *Zootaxa* 4299: 75-94.

Landestoy, T.M.A. 2023. Arboreality in blindsnakes (Typhlopidae) and threadsnakes (Leptotyphlopidae) from Hispaniola. *Caribbean Herpetology* 89: 1-3.

Martins, A.; Baptista, G.M.; Maciel, D.B. & Gonzalez, R.C. 2018. A new defensive behaviour for threadsnakes and the defensive repertoire of *Trilepida jani* (Pinto & Fernandes, 2012)(Epictinae: Leptotyphlopidae). *Herpetology Notes* 11: 839-841.

Minton, A.S. Jr. 1966. A contribution to the herpetology of West Pakistan. *Bulletin of the American Museum of Natural History* 134: 29-184.

Mole, R.R. 1924. The Trinidad Snakes. In Proceedings of the Zoological Society of London, 94: 235-278.

Nogueira, C.; Argólo, A.; Arzamendia, V.,;Azevedo, J.; Barbo, F.; Bernils, R.; Bolochio, B.; Borges-Martins, M.; Brasil-Godinho, M.; Braz, H.; Buononato, M.; Cisneros-Heredia, D.; Colli, G.; Costa, H.; Franco, F.; Giraudo, A.; Gonzales, R.; Guedes, T.; Hoogmoed, M.; Marques, O.; Montingelli, G.; Passos, P.; Prudente, A.; Rivas, G.; Sanchez, P.; Serrano, F.; Silva, Jr. N.; Strüssmann, C.; Vieira-Alencar, J.; Zaher, H.; Sawaya, R. & Martins, M. 2019. Atlas of Brazilian snakes: verified point-locality maps to mitigate the Wallacean shortfall in a megadiverse snake fauna. South American Journal of Herpetology, 14(sp1): 1-274

Pinto, R.R. & Curcio, F.F. 2011. On the generic identify of *Siagonodon brasiliensis*, with the description of a new leptotyphlopid from Central Brazil (Serpentes: Leptotyphlopidae). *Copeia* 2011: 53-63.

Pough, F.H.; Andrews, R.H.; Crump, M.L.; Savitzky, A.H.; Wells, K.D. & Brandley M.C. 2016. Herpetology. 4th edition. Upper Saddle River. Pearson Pretince Hall. 744 pp.

Repp, R.A. 2019. Movin' On Up! Some notes on arboreal behaviors with three species of fossorial snakes: Sonoran coralsnakes (*Micruroides euryxanthus*), western threadsnakes (*Rena humilis*) and spotted nightsnakes (*Hypsiglena chlorophaea*). *Chicago Herpetological Society* 54: 148-152.

Richmond, N.D. 1955. The blind snakes (*Typhlops*) of Bimini, Bahama Islands, British West Indies, with description of new species. *American Museum Novitates* 1734: 1-7.

Schmidt, K.P. & Walker, W.F. 1943. Snakes of the Peruvian coastal region. Field Museum of Natural History Publication. Zoological Series, 24: 297-329

Shine, R. & Webb, J.K. 1990. Natural history of Australian typhlopid snakes. *Journal of Herpetology* 24: 357-363.

Taylor, E.H. 1922. The Snakes of the Philippine Islands. Philippine Bureau of Science, Manila, Philippines. 312 pp.

Tolson, P.J. & Campbell, III E.W. 1989. Life history notes: Typhlops richardi. *Herpetological Review* 20: 75

Tozetti, A.M.; Morato, S.A.A.; Bérnils, R.S.; Loebmann, D.; Toledo, L.F.; Gray, R. & Entiauspe-Neto, O.M. 2021. Evolutionary dynamics shape two passive defensive mechanisms in Neotropical snake radiations. *Phyllomedusa: Journal of Herpetology* 20: 3-13.

Tozetti, A.M.; Oliveira, R.B. & Pontes G.M.F. 2009. Defensive repertoire of *Xenodon dorbignyi* (Serpentes, Dipsadidae). *Biota Neotropica* 9: 157-163.

Vanzolini, P.E. 1970. Climbing habits of Leptotyphlopidae (Serpentes) and walls's theory of the evolution of the ophidian eye. *Papéis Avulsos de Zoologia*, 23: 13-16.

Visser, J. 1966. Colour change in *Leptotyphlops scutifrons* (Peters) and notes on its defensive behavior. *Zoologica Africana* 2: 123-125.

Watkins, J.F.; Gehlbach, F.R. & Kroll, J.C. 1969. Attractant-Repellent Secretions of Blind Snakes (*Leptotyphlops Dulcis*) and Their Army Ant Prey (Neiv Amyrmex Nigrescens). *Ecology*, 50: 1098-1102.

Webb, J.K.; Shine, R.; Branch, W.R. & Harlow, P.S. 2000. Lifehistory strategies in basal snakes: reproduction and dietary habits of the African thread snake *Leptotyphlops scutifrons* (Serpentes: Leptotyphlopidae). *Journal of Zoology* 250: 321-327.