

A case of iris heterochromia in Lancehead *Bothrops erythromelas*, from northeastern Brazil (Serpentes: Viperidae)

Isaac S. Dantas¹, Salomão J. F. Bispo^{1,2}, Rodrigo O. L. Salles³, Rodrigo C. Gonzalez^{1,*}

¹ Museu de História Natural do Ceará Prof. Dias da Rocha, Universidade Estadual do Ceará, 62770-000 Pacoti, CE, Brazil.

² Centro Universitário Inta, 62050-100 Sobral, CE, Brazil.

³ Departamento de Vertebrados, Museu Nacional, Universidade Federal do Rio de Janeiro, 20940-040, Rio de Janeiro, RJ, Brazil.

*Corresponding author. E-mail: rodcastgon@gmail.com

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Heterochromia is an ocular condition characterized by a difference in the coloration of the iris within the same individual, which can be hyperchromic or hypochromic. This condition may be of two main types: complete heterochromia (*heterocromia iridis*, in plural), where each eye has its iris with a specific coloration, and partial heterochromia (*heterocromia iridum*, in singular), where only a portion of the iris has a distinct color (Partington, 1964; Silva *et al.*, 2021). This variation results from the uneven distribution of pigments during embryonic development (Gladstone, 1969; Silva *et al.*, 2021). In most cases, this condition is benign, sporadic, and occurs without any oth-

er detectable abnormality (Silva *et al.*, 2021). Though well-documented for humans, cats, dogs, horses, and buffaloes (Misk *et al.*, 1998; Newkirk *et al.*, 2010; Chomdej *et al.*, 2018; Da Silva *et al.*, 2021), it is an uncommon disorder in snakes, with only a few reports in the literature (Mathielo *et al.*, 2021; Suárez *et al.*, 2021). Here we report the first case of *heterochromia iridis* in *Bothrops erythromelas*, which holds significant importance due to the rarity of such occurrences and the limited documentation of this condition in snakes. We also emphasize the importance of reporting unusual occurrences in wildlife as they are found.

Bothrops erythromelas is a terrestrial and nocturnal snake, responsible for

many snakebites in northeastern Brazil, occurring in dry and humid habitats within the Caatinga ecoregion. It is a small viper, mean SVL 55 cm, with a generalist diet, feeding on frogs, lizards, mammals, and centipedes (Campbell & Lamar, 2004; Barros et al., 2014). It is the most common venomous snake in the Caatinga, with marginal records in the Atlantic Forest and Cerrado in Brazil (Nogueira et al., 2019). An adult *B. erythromelas* (SVL > 1m) was captured by an anonymous collector in the state of Bahia, Brazil (no further information available) on 1 February 2007, and was delivered to Instituto Butantan (not cataloged, and lost in a fire that destroyed the herpetological collection in 2010). This specimen presented two different eye colors, the right eye normal light gray (Fig. 1a), while the left eye was blood-red (Fig. 1b).

Heterochromia in snakes is apparently rare, as there are few records in the literature (Mathielo et al., 2021). Two recent records mentioned the occurrence of *heterochromia iridis* in Pseudoboini: *Oxyrhopus trigeminus* in southeastern Brazil (Mathielo et al. 2021), and *Clelia scytalina* in Costa Rica (Suárez et al. 2021). This report is the first record of heterochromia in *Bothrops erythromelas* in northeastern Brazil. Heterochromia may be congenital or acquired due to ocular injuries, traumas, or medical conditions (Tomar et al., 2018). Heterochromia is generally harmless and

the specimen mentioned here, and the ones presented in Mathielo et al. (2021), and Suárez et al. (2021) seem to have reached adulthood, which indicates that these conditions have not affected its survivorship. Even if this condition affected the vision, in vipers it would have minimal effects, because they use their thermal loreal pits to locate prey and defend themselves (Campbell and Lamar 2004).

REFERENCES

- Barros V.A., Rojas C.A., Almeida-Santos S.M. 2014. Reproductive biology of *Bothrops erythromelas* from the Brazilian Caatinga. *Advances in Zoology* 2014:1–11.
- Campbell J.A., Lamar E.D. 2004. The Venomous Reptiles of the Western Hemisphere. Cornell University Press, Ithaca. doi:10.1155/2014/680861.
- Chomdej S., Leelawattanakul P., Buddhachat K., Pradit W., Siengdee P., Phongroop K., Nganvongpanit K. 2018. Preliminary study on association of EDNRB gene with heterochromia iridis in cats (*Felis catus*). *Kafkas Üniversitesi Veteriner Fakültesi Dergisi* 24:1–6. doi:10.9775/kvfd.2018.20082.

Freitas S.L., Beck L.A.S., Fagundes D.C., Hallal R.J.Jr. 2021. Heterocromia de íris: uma revisão das condições que podem afetar a pigmentação iridiana. *Revista Brasileira de Oftalmologia* 80:1–7. doi:10.37039/1982.8551.20210050.

Gladstone R.M. 1969. Development and significance of heterochromia of the iris. *Archives of Neurology* 21:184–192. doi:10.1001/archneur.1969.00480140084008.

Mathielo R.S., Vieira I.R.G., Demonier L., Silva-Soares T. 2021. *Oxyrhopus trigeminus* (False Coral). Chromatic Anomaly. *Herpetological Review* 52:168–169.

Misk N.A., Semieka M.A., Fathy A. 1998. Heterochromia iridis in buffaloes. *Assiut Veterinary Medical Journal*, 38.2(76): 161–191. doi:10.21608/AVMJ.1998.183157.

Newkirk K.M., Haines D.K., Calvarese S.T., Esson D.W., Chandler H.L. 2010. Distribution and amount of pigment within the ciliary body and iris of dogs with blue and brown irides. *Veterinary ophthalmology* 13:76–80. doi:10.1111/j.1463-5224.2009.00756.x.

Nogueira C.C., Argolo A.J.S., Arzamendia V., Azevedo J.A., Barbo F.B., Bernils R.S., ... 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* 14:1–274. doi:10.2994/SA-JH-D-19-00120.1

Partington M.W. 1964. Waardenburg's syndrome and heterochromia iridum in a deaf school population. *Canadian Medical Association Journal* 90:1008.

Silva L.F., Lima A.S., Dall'Oglio C.F., Hallal R.J.Jr. 2021. Heterocromia de íris: uma revisão das condições que podem afetar a pigmentação iridiana. *Revista Brasileira de Oftalmologia* 80:e0050. doi:10.37039/1982.8551.20210050

Suárez J.E.C., Martínez C.G.H., Roda Á.A.Z. 2021. Black-eye malformations in two herpetofaunal species from the Central Region and Caribbean Coast of Costa Rica. *Reptiles & Amphibians* 28:425–427.

Tomar M., Dhiman R., Sharma G., Yadav N. 2018. Artistic iris: a case of congenital sectoral heterochromia iridis. *Journal of Ophthalmic & Vision Research* 13: 359–360. doi:10.4103/jovr.jovr_91_17

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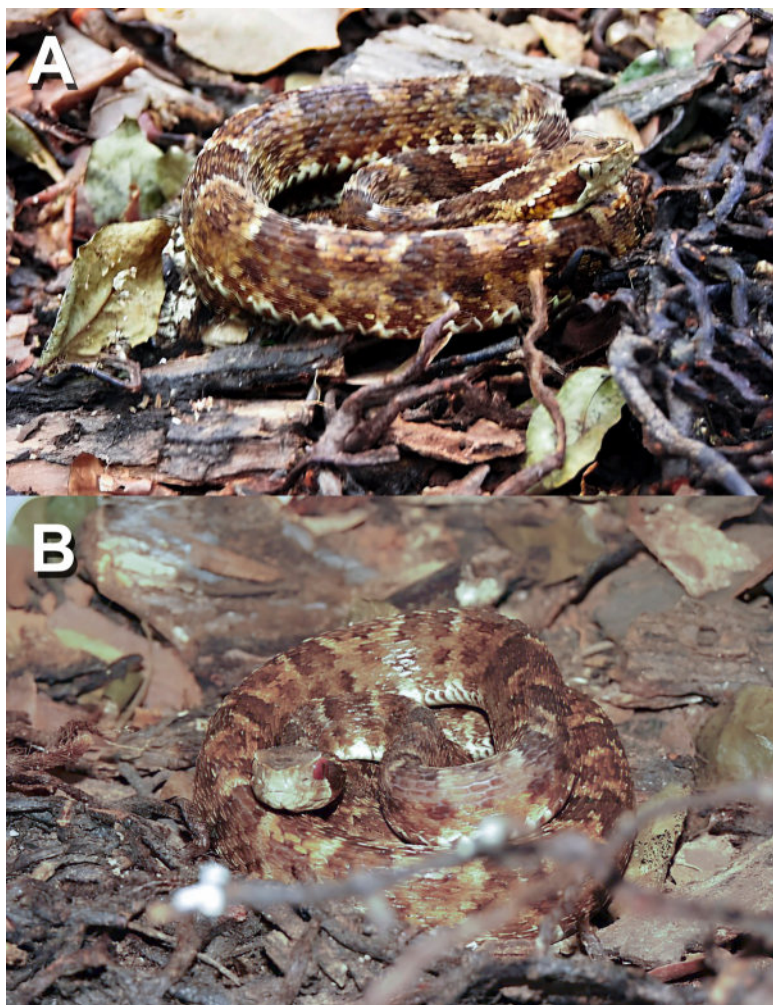


Figura 1. *Bothrops erythromelas*, SVL 100 cm, from Bahia, Brazil, showing different eye colors: (a) right side with gray eye, (b) left side with red eye.