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NOTES ON GEOGRAPHIC DISTRIBUTION

New record of *Vitreorana franciscana* Santana, Barros, Pontes & Feio, 2015 (Anura, Centrolenidae), a glassfrog endemic to the Brazilian Cerrado

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Abstract. We report a new locality for the endemic glassfrog *Vitreorana franciscana* Santana, Barros, Pontes & Feio, 2015 from Brazilian Cerrado, from the municipality of Nova Ponte, state of Minas Gerais, Brazil. Field visits were conducted in 2023 at Fazenda Brejão and resulted in the fourth record of this species, which expands this species' geographic distribution by 150 km to the east. With the new record, the minimum convex polygon for the species is now 18,210 km^2.

Key words. Amphibian, distribution, gallery forest, Minas Gerais, savannah

Maffei F, Moya GM, Sousa ES, Morais DH (2024) New record of *Vitreorana franciscana* Santana, Barros, Pontes & Feio, 2015 (Anura, Centrolenidae), a glassfrog endemic to the Brazilian Cerrado. Check List 20 (4): 1041–1045. https://doi.org/10.15560/20.4.1041

INTRODUCTION

Glassfrogs (Anura, family Centrolenidae) comprise a highly diverse and widely distributed group in South and Central America, currently with 12 genera and 164 species divided into three clades: Centroleninae, Hyalinobatrachinae, and *Ikakogi* (Frost 2024). They are small, arboreal, and called glass frogs because of their translucent ventral skin. They are associated with streams in forested areas (Castroviejo-Fisher et al. 2014). Almost half of the species assessed by the International Union for Conservation of Nature (IUCN) are threatened (11 Critically Endangered, 39 Endangered, and 19 Vulnerable), and 11 are Near Threatened (IUCN 2023). Another 14 are Data Deficient (IUCN 2023).

Brazil has four genera of centrolenids with a total of 17 species: *Hyalinobatrachium cappellei* Van Lidth de Jeude, 1904; *H. carlesvilai* Castroviejo-Fisher, Padial, Chaparro, Aguayo-Vedia & De la Riva, 2009; *H. iaspidiense* (Ayarzaguena, 1992); *H. mondolfii* Señaris & Ayarzagüena, 2001; *H. muiraquitan* Oliveira & Hernández-Ruz, 2017; *H. munozorum* (Lynch & Duellman, 1973); *H. taylori* (Goin, 1968); *H. tricolor* Castroviejo-Fisher, Vilà, Ayarzagüena, Blanc & Ernst, 2011; *Cochranela resplendens* (Lynch & Duellman, 1973), *Teratohyla adenocheira* (Harvey & Noonan, 2005); *T. midas* (Lynch & Duellman, 1973); *Vitreorana baliomma* Pontes, Caramaschi and Pombal, 2014; *V. eurygnata* (Lutz, 1925); *V. franciscana* Santana, Barros, Pontes & Feio, 2015; *V. parvula* (Boulenger, 1895); *V. ritae* (Lutz, 1952); and *V. uranoscopa* (Müller, 1924) (Segalla et al. 2021). Four of these species are in the Cerrado biome: *Hyalinobatrachium taylori*, *V. eurygnatha*, *V. franciscana*, and *V. uranoscopa* (Silva et al. 2020), with the last three having records in the state of Minas Gerais (Frost 2024). *Vitreorana uranoscopa* was described from individuals collected in Serra da Canastra National Park, municipality of São Roque de Minas. Later, the species was recorded in São Gotardo and Presidente Olegário, all in Minas Gerais state (Santana et al. 2015; Bang et al. 2020). Here, we report a new locality record and an extension of the range of *Vitreorana franciscana*, a glassforg endemic to the Brazilian Cerrado, in the state of Minas Gerais, Brazil.

OPEN ACCESS

Academic editor: Raúl Maneyro
Received: 26 March 2024
Accepted: 17 June 2024
Published: 29 August 2024

Figure 1. Small stream in a gallery forest of the Cerrado at Fazenda Brejão, Nova Ponte, Minas Gerais state, southeast Brazil.

METHODS

Field visits were conducted in 2023 in January, February, September, October, and November at Fazenda Brejão, located in the municipality of Nova Ponte, State of Minas Gerais, southeast Brazil. The farm has *Eucalyptus* plantations, and its entire limit is surrounded by areas of Cerrado with swamps, reservoirs, and gallery forests. The search in breeding sites (Scott and Woodward 1994) was conducted at dusk during one night per visit. Searches were conducted at the edge of a small stream (1.5 m wide and 0.8 m deep) in gallery forest of the Cerrado (Figure 1). The streambed was rocky and the water flowed rapidly. The glass-frog specimen was calling on a fern (*Cyathea* sp.) 2 m high at the edge of a stream. During all visits (except October), males were recorded calling, with a maximum abundance of four individuals in February. A male specimen was manually captured on 24 February 2023, euthanized with lidocaine, fixed in 10% formalin for 24 h, stored in 70% ethanol, and deposited in the zoological collection of Universidade Federal do Mato Grosso do Sul, Campo Grande, MS, Brazil (**ZUFMS**). The advertisement call of this individual was recorded and deposited in the Fonoteca Neotropical Jacques Vielliard, Universidade Estadual de Campinas, Campinas, SP, Brazil (**FNJV**).

RESULTS

***Vitreorana franciscana* Santana, Barros, Pontes & Feio, 2015**
Figure 2

New records. BRAZIL – Minas Gerais • Nova Ponte; 19°04′07.96″S, 047°37′34.22″W; 938 m a.s.l.; 24.II.2023; Maffei F, Moya GM, Morais DH leg.; 1 ♂, ZUFMS-AMP 19.394 (Figure 2). Call records FNJV 81724 and 81725.

Figure 2. Adult male of *Vitreorana franciscana* recorded in the municipality of Nova Ponte, Minas Gerais, southeast Brazil.

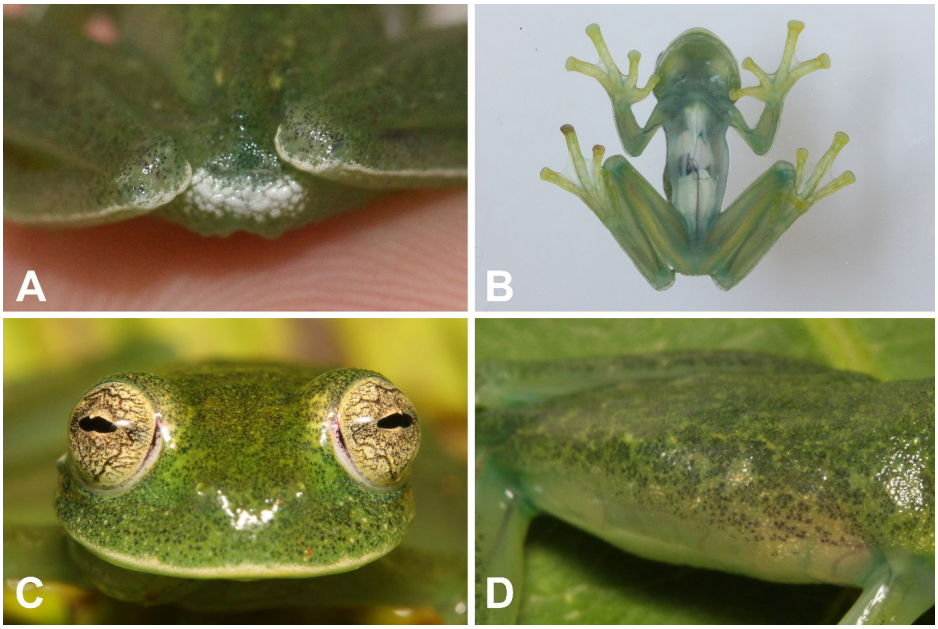

Figure 3. Identification characters for *V. franciscana*. **A.** Cloacal tubercles. **B.** Translucent gastrointestinal peritoneum. **C.** Tan iris with surrounding black reticulations. **D.** Reticulated arrangement of melanophores on dorsum.

Identification. The collected specimen was identified as *V. franciscana* based on its morphological characteristics: cloacal ornamentation with a flap above the cloaca and an aggregate of small, enameled, and thickened tubercles, more pronounced in the cloacal opening (Figure 3A); translucent gastrointestinal peritoneum (Figure 3B); in life, bronze iris with black reticulations (Figure 3C); by the colour of the dorsal skin, and reticulated arrangement of melanophores on dorsum (Figure 3D). The captured individual was an adult male with a snout–vent length of 22.1 mm, within the species' standard range (21.9–24.1 mm; Santana et al. 2015).

Geographic range. *Vitreorana franciscana* occurs only in the Minas Gerais Cerrado and was nown until now from three localities: São Roque de Minas - Parque Nacional da Serra da Canastra (type locality), São Gotardo, and Presidente Olegário (Santana et al. 2015; Bang et al. 2020). Here we present the fourth record of the species, expanding its geographic distribution by 150 km to the east (Figure 4). With the new record, the minimum convex polygon for the species is 18.210 km^2.

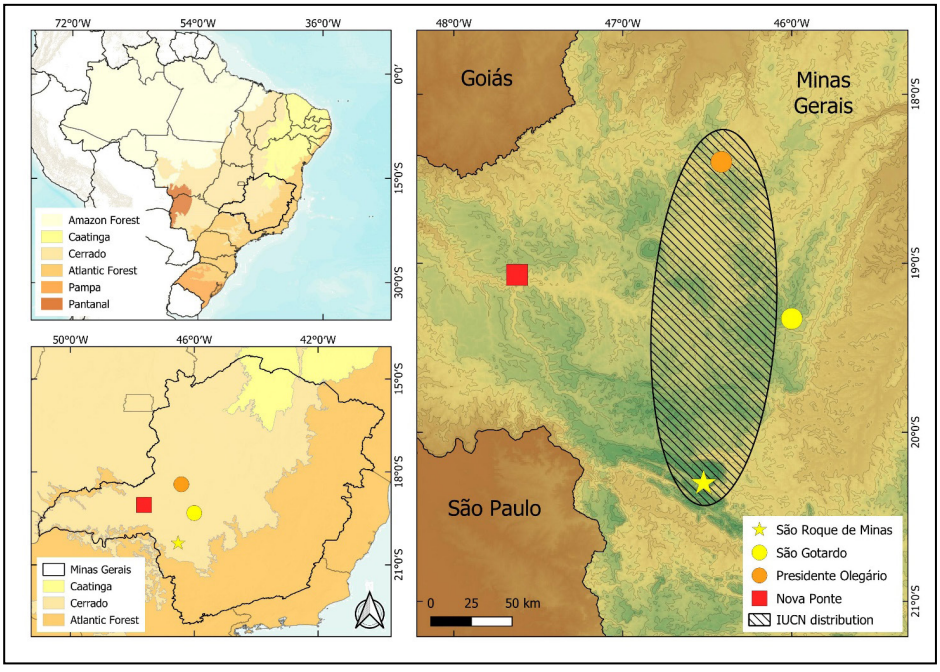

Figure 4. Geographic distribution of *Vitreorana franciscana* in Minas Gerais state. Type locality (yellow star), São Gotardo (yellow dot), Presidente Olegário (orange dot), and new record from Nova Ponte (red square).

DISCUSSION

Amphibians are dependent on moisture, and most species still depend on bodies of water for reproduction, as is the case with centrolenids. These frogs have a specialized spawning where the eggs are deposited on leaves above the water body, and later the tadpoles fall into the water to complete their metamorphosis (Haddad and Prado 2005). Thus, the reproductive site depends on extremely humid environments to avoid egg desiccation. This limited the distribution of the family to humid forest environments in its distribution in Brazil (Atlantic Forest and Amazon Rainforest).

In the Cerrado biome, these frogs are restricted to preserved gallery forests, humid and shadow habitats, related to small streams. The records of *Hyalinobatrachium* taylori in the Tocantins state (Silva et al. 2020), and *Vitreorana eurygnatha* in the Goiás state (Cintra et al. 2013), are examples of this. The similarity in flora of gallery and riparian forests of Cerrado with humid forests (Atlantic and Amazon forests) (Oliveira-Filho et al. 2000) may have favored the distribution of this family into this biome (Cintra et al. 2013).

Data on the distribution and calling of glass frogs are important for taxonomic and conservation purposes (Castroviejo-Fisher et al. 2011). Thus, the present work contributes to the knowledge of the distribution of centrolenids in the Cerrado biome, and the new record presented here demonstrates the ability of individuals of this species to adapt to gallery forests in open areas of the Cerrado region of the Triângulo Mineiro.

ACKNOWLEDGEMENTS

We thank Gabriel Mendes for assistance with fieldwork, LD Celulose for funding the study, and Diego Santana for assistance in identification. This article is a tribute to Dr. Marcelo Menin for his contribution to the study of Brazilian amphibians and the Triângulo Mineiro.

ADDITIONAL INFORMATION

Conflict of interest
The authors declare that no competing interests exist.

Ethical statement
No ethical statement is reported.

Funding
DHM would like to thank Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for providing research fellowship (316264/2021-0).

Author contributions
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Data availability
All data that support the findings of this study are available in the main text

REFERENCES

Ayarzagüena J (1992) Los centrolenidos de la Guayana Venezolana. Publicaciones de la Asociación de Amigos de Doñana 1: 1–48.

Bang DL, Lisboa BS, Teixeira BFV, Giaretta AA, Carvalho TR (2020) A comparative acoustic analysis of species of *Vitreorana* (Anura: Centrolenidae) from the Brazilian Atlantic Forest and Cerrado, with a description of the call of *V. baliomma* and insights into the taxonomic status of Cerrado populations. Phyllomedusa 19: 35–47. https://doi.org/10.11606/issn.2316-9079.v19i1p35-47

Boulenger GA (1895) Third report on additions to the batrachian collection in the Natural History Museum. Proceedings of the Zoological Society of London 1894: 640–646, 2 pls.

Castroviejo-Fisher S, Padial JM, Chaparro JC, Aguayo-Vedia D, De la Riva I (2009) A new species of *Hyalinobatrachium* (Anura: Centrolenidae) from the Amazonian slopes of the central Andes, with comments on the diversity of the genus in the area. Zootaxa 2143: 24–44. https://doi.org/10.11646/zootaxa.2143.1.2

Castroviejo-Fisher S, Vilà C, Ayarzagüena J, Blanc M, Ernst R (2011) A new species of *Hyalinobatrachium* (Anura: Centrolenidae) from the Amazonian slopes of the Andes in Peru. Zootaxa 3796: 401–427. https://doi.org/10.11646/zootaxa.2143.1.2

Castroviejo-Fisher S, Guayasamin JM, Gonzalez-Voyer A, Vilà C (2014) Neotropical diversification seen through glassfrogs. Journal of Biogeography 41: 66–80. https://doi.org/10.1111/jbi.12208

Cintra CED, Silva HLR, Silva Jr. NJ (2013) New state record of *Vitreorana eurygnatha* (Lutz 1925) (Anura: Centrolenidae) in Brazil. Herpetology Notes 6: 587–590.

Frost DR (2024) Amphibian species of the world: an online reference (version 6.2). http://research.amnh.org/vz/herpetology/amphibia/. Accessed on: 2024-01-29.

Goin, CJ (1968) Two new species of centrolenid frogs from Colombia. Proceedings of the Biological Society of Washington 81: 81–88.

Haddad CFB, Prado CPA (2005) Reproductive modes in frogs and their unexpected diversity in the Atlantic Forest of Brazil. BioScience 55: 207–217. https://doi.org/10.1641/0006-3568(2005)055[0207:rmifat]2.0.co;2

Harvey MB, Noonan BP (2005) A new species of glassfrog (Centrolenidae: Teratohyla) from the Lowlands of Northwestern Ecuador and its Phylogenetic Relationships. Herpetologica 61 (2): 148–156.

IUCN (2023) The IUCN Red List of threatened species. Version 2023-1. https://www.iucnredlist.org/. Accessed on: 2024-01-29

Lutz A (1925) Amphibians from Brazil. Proceedings of the National Academy of Sciences of the United States of America 180 (24): 1273–1275.

Lutz B (1952) Frogs of Pernambuco. Memories of the Oswaldo Cruz Institute 50 (2): 223–226.

Lynch JD, Duellman WE (1973) A review of the centrolenid frogs of Ecuador, with descriptions of new species. Occasional Papers of the Museum of Natural History, the University of Kansas 4: 1–66.

Müller L (1924) A new species of *Hyalinobatrachium*. Zoological Journal 59: 208–209.

Oliveira EA, Hernández-Ruz EJ (2017) New species of glassfrog, genus *Hyalinobatrachium* (Anura: Centrolenidae), for the Brazilian Amazon revealed by mitochondrial DNA and morphology. International Journal of Research Studies in Biosciences 5 (3): 41–52. https://doi.org/10.20431/2349-0365.0503007

Oliveira-Filho AT, Ratter JA, Shepherd GJ (1990) Floristic composition and community structure of a central Brazilian gallery forest. Flora 184: 103–117. https://doi.org/10.1016/s0367-2530(17)31598-0

Pontes JAL, Caramaschi U, Pombal Jr. JP (2014) A remarkable new glass frog (Centrolenidae: Vitreorana) from the northeast Atlantic forest, Brazil. Herpetologica 70: 298–308. https://doi.org/10.1655/herpetologica-d-13-00024

Santana DJ, Barros AB, Pontes R, Feio RN (2015) A new species of glassfrog genus *Vitreorana* (Anura, Centrolenidae) from the Cerrado Domain, southeastern Brazil. Herpetologica 71: 289–298. https://doi.org/10.1655/herpetologica-d-14-00066

Scott Jr. NJ, Woodward BD (1994) Surveys at breeding sites. In: Heyer W, Donnelly MA, McDiarmid RW, Hayek LAC, Foster MS (Eds.) Measuring and monitoring biological diversity: standard methods for amphibians. Smithsonian Institution Press, Washington DC, USA, 84–92.

Segalla M, Berneck B, Canedo C, Caramaschi U, Cruz CAG, Garcia PCA, Grant T, Haddad CFB, Lourenço AC, Mangia S, Mott T, Nascimento L, Toledo LF, Werneck F, Langone JA (2021) List of Brazilian amphibians. Herpetologia Brasileira 10: 121–216. https://doi.org/10.5281/zenodo.4716176

Señaris JC, Ayarzagüena J (2001) Una nueva especie de rana de cristal del género *Hyalinobatrachium* (Anura: Centrolenidae) del Delta del Río Orinoco, Venezuela. Revista de Biología Tropical 49: 1083–1093.

Silva LA, Carvalho PS, Pereira EA, Fadel RM, Dantas SP, Brandão RA, Santana DJ (2020) Richness, diversity patterns, and taxonomic notes of amphibians from the Tocantins state. Biota Neotropica 20 (1): e20190838. httsp://doi.org/10.1590/1676-0611-bn-2019-0838

Van Lidth de Jeude, TW (1904) Reptiles and batrachians from Surinam. Notes from the Leyden Museum 25: 83–94.