

## ***Allobates brunneus* (Cope, 1887) (Anura, Aromobatidae): significant distribution extension for a formerly critically endangered species from the Brazilian Cerrado**

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*Localities.*— We recorded specimens of *A. brunneus* in at least 14 localities from four municipalities of Mato Grosso state (Brazil: Fig. 1).

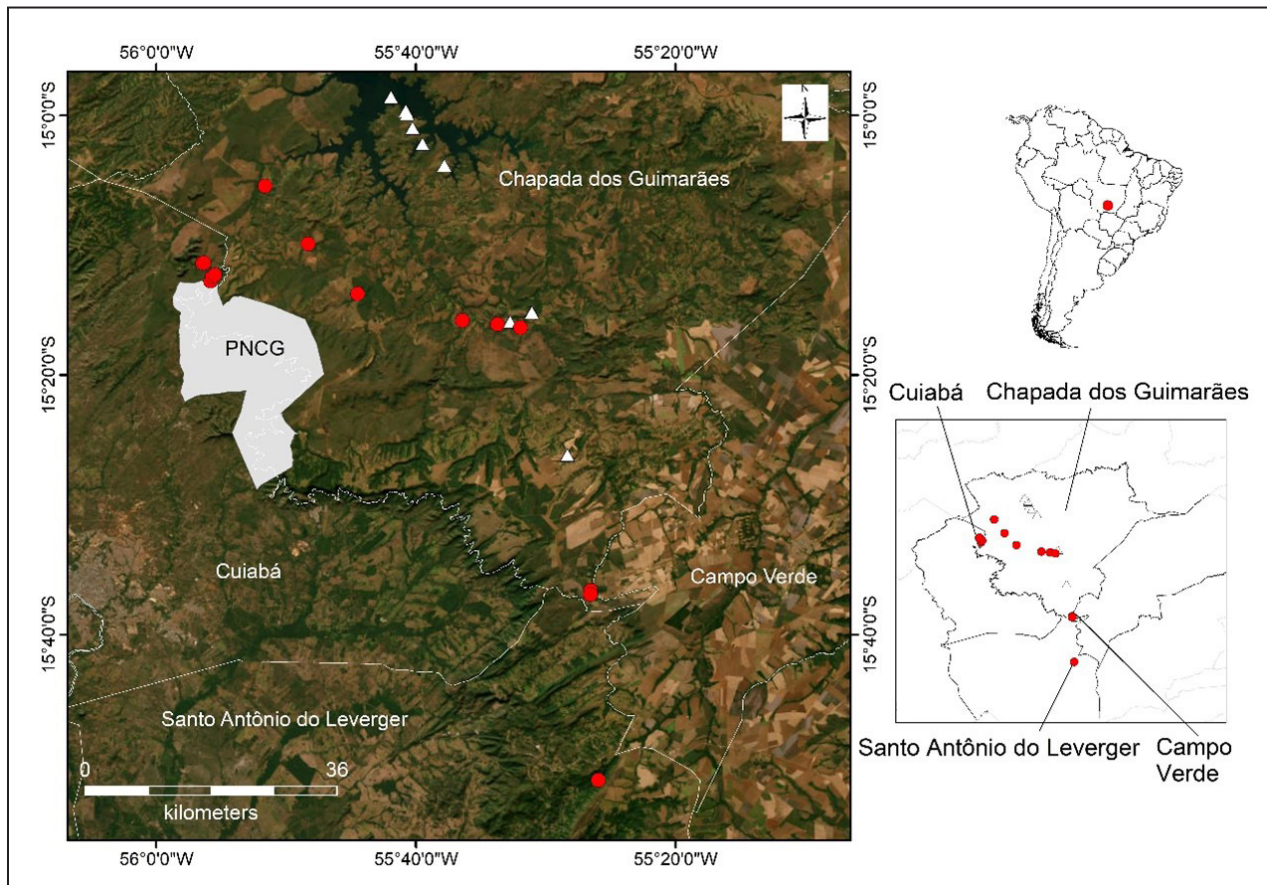
(1) Santo Antônio do Leverger Municipality, Serra de São Vicente (Lat. -15.853663°, Long. -55.432219°), November 2013, one male adult (Fig. 2A) observed by VAC (see Acknowledgements);

(2) Campo Verde Municipality (Lat. -15.610240°, Long. -55.441949°), November 2019, one male adult observed by CS in the riparian forest of Casca river;

(3) Chapada dos Guimarães Municipality: I) Comunidade Peba/Cachoeira Rica (Lat. -15.268262°, Long. -55.561704°), October 2019, observed by BB, CS, TFD-R, and MVA. Three male adults recorded in the leaf litter of a swamp forest, locally called *buritizal* (monodominant stand of the buriti palm—*Mauritia flexuosa* L.f.), at 09:56 a.m. (Fig. 2B); II) Comunidade Peba/Cachoeira Rica (Lat. -15.2725532°, Long. -55.5323062°), October 2019, observed by CS and MVA. Eight male adults recorded in the leaf litter of a *buritizal* between 06:05 - 07:05 a.m.; III) Comunidade Peba/Cachoeira Rica (Lat. -15.265925°, Long. -55.606554°), November 2019, two male adults observed by CS; IV) Água Fria (Lat. -15.164834°, Long. -55.805071°), January 2020, observed by BB, CS, and MVA. Ten unsexed adults recorded in the leaf litter of a *buritizal* at 05:50 a.m.; V) Água Fria (Lat. -15.229135°, Long. -55.741601), February 2020, observed by CS and MVA. Three male adults recorded in the leaf litter of

a *buritizal* at 08:50 a.m.; VI) Cachoeira do Pingador (Lat. -15.090651°, Long. -55.860354°), January 2020, observed by CS and BB. Three male adults recorded calling at 18:05 p.m.; VII) Parque Nacional da Chapada dos Guimarães (Chapada dos Guimarães National Park), headwaters of the Coxipó-Açu river (Lat. -15.212625°, Long. -55.930245°, 350 m elev.), December 2020. One specimen collected by BB and CS and deposited in the Herpetological collection of Universidade Federal de Mato Grosso (UFMT 19648). The individual was recorded in the leaf litter of a riparian forest established on hydromorphic soil, at 09:03 a.m. (Fig. 2C); VIII) Camping da Deusa (Lat. -15.615011°, Long. -55.442168°), December 2020, collected by BB, CS, and VDSA (see Acknowledgements) and deposited in the Herpetological collection of Universidade Federal de Mato Grosso (UFMT 19649–19654). Six male adults recorded between 06:02 – 06:20 a.m. and 16:46 – 16:50 p.m. in the riparian forest of Casca river (Fig. 2D);

(4) Cuiabá Municipality: I) Loteamento Ecoville da Chapada (Lat. -15.189814°, Long. -55.940870°), March 2020, observed by CS and TFD-R. Four male adults recorded in the leaf litter of a *buritizal* along the riparian forest of Coxipó-Açu river at 06:00 a.m.; II) Loteamento Ecoville da Chapada (Lat. -15.189308°, Long. -55.938889°), December 2020, collected by BB and CS and deposited in the Herpetological collection of Universidade Federal de Mato Grosso (UFMT 19646–19647). Two male adults were recorded at 06:23 and 06:36 a.m.



**Figure 1.** Distribution of *Allobates brunneus* in South America. Red dots = new records reported in this study; white triangles = previously known records. PNCG = Parque Nacional de Chapada dos Guimarães.

Comments.— The genus *Allobates* Zimmerman and Zimmerman, 1988 (Aromobatidae) comprises 63 species (Frost, 2024) of cryptically colored leaf-litter anurans (Grant *et al.*, 2006), commonly known as nurse-frogs. They are distributed throughout Central and South America (in the Pacific lowlands of Colombia and Ecuador; north and west in Central America to Nicaragua; Martinique, and Amazonian drainages in Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana, Surinam, and French Guiana; Frost, 2024). Most of the 32 species already recorded in Brazil (Segalla *et al.*, 2021) have Amazonian distributions (Grant *et al.*, 2006), and only two species are distributed in localities along the Cerrado ecoregion: *Allobates goianus* (Bokermann, 1975) and *A. brunneus* (Cope, 1887) (Valdujo *et al.*, 2012).

*Allobates brunneus* was described after specimens collected in Chapada dos Guimarães (state of Mato Grosso, midwestern Brazil), in the western Cerrado. Nearly a century after its description, the species was

rediscovered in riparian habitats of affluents of the Manso river, one of the main tributaries to the Cuiabá river, belonging to the upper Paraguay river basin (Strüssmann, 2000). At that time, large populations of *A. brunneus* were recorded in *buritizais* occurring along the Casca and Quilombo rivers. Most of these habitats were subsequently flooded during the filling of the reservoir of the Manso hydroelectric power plant, leading to severe population reduction of *A. brunneus*. Some small subpopulations of *Allobates brunneus* remained in the headwaters of the Casca river, in private properties situated outside the limits of the neighboring Chapada dos Guimarães National Park (Lima *et al.*, 2009). With its extent of occurrence (EOO) previously estimated to be lower than 5 km<sup>2</sup>, *A. brunneus* was initially listed as Critically Endangered–CR and presently as Near Threatened–NT, in the Brazilian Red List (see Bastos *et al.*, 2023). In the IUCN Red List (IUCN SSC Amphibian Specialist Group, 2023), the species is listed as Endangered–EN.



**Figure 2.** Adult males of *Allobates brunneus* recorded in Santo Antônio do Leverger (A) and Chapada dos Guimarães (B -D), Mato Grosso State, Brazil.

Our records of *Allobates brunneus*—all of them in the Mato Grosso state and in the Cerrado ecoregion—include the first occurrence of the species for the municipalities of Santo Antônio do Leverger, Campo Verde, and Cuiabá, and increase from one to four the number of municipalities where the species is currently known. They extend the known geographic distribution of the species approximately 43 km westward and 67 km southeastward. Besides, one population was located within a protected area (the Chapada dos Guimarães National Park) for the first time.

Even though our data still reveal a somewhat restricted distribution, the EOO of *A. brunneus* is herein estimated to be 1,992 km<sup>2</sup> and the AOO, 56 km<sup>2</sup>. The EOO estimate excludes the historical records for the Manso hydroelectric power plant (Chapada dos Guimarães), where there has been significant habitat loss by flooding. We also recorded cattle trampling and/or drainage of *buritizais* in part of the species' AOO, which promote a continuing decline in habitat quality. However, we found neither

evidence of severe fragmentation nor of a continuing decline in the number of mature individuals or the number of subpopulations. Extensive *buritizais* do occur to the north of the EOO of *A. brunneus*, where the occurrence of this or of related species (see Lima *et al.*, 2009) should be investigated. Therefore, investment is needed to better delineate the boundaries of the geographic distribution of *A. brunneus*. In addition, investments are also needed for habitat-focused conservation initiatives.

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