

First record of phocomelia in a Brazilian anuran

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Environmental contamination has been linked to cases of morphological anomaly in amphibians worldwide with a notable increase in the number of such reports in recent decades (Henle et al., 2017a; White et al., 2023). Among the anomalies related to limb deformities there is phocomelia, a congenital malformation characterised by the absence of portions of the limb associated with the partial or total absence of the proximal segment, resulting in the development of distal bone structures (metacarpals/metatarsals/phalanges) in abnormal position (Meteyer, 2000a; Henle et al., 2017b). In this study, we report the first documented case of phocomelia in the frog *Thoropa miliaris* (Spix, 1824). This is an endemic species from the Atlantic Forest, found across eastern and south-eastern Brazil (Frost, 2024).

In April 2022, we examined an adult specimen of *T. miliaris* (CHNF 1419, snout-vent length 64.5 mm, female) that had been collected on 30 January 2022, in Juiz de Fora, Minas Gerais, Brazil (-21.77660, -43.29055, 648 m a.s.l.), under the SISBio collection authorisation number #77181–2. The specimen was preserved in 10% neutral buffered formalin and deposited in the Coleção Herpetológica do Norte Fluminense (CHNF) at the Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF). Externally, an anomaly was observed in the distal portion of the specimen's right hind-limb, characterised by a partial absence of the middle and distal thirds of the tibiofibula, evident in the topography. Additionally, two structures were visible adjacent to the ipsilateral femorotibial joint (Fig. 1A & B). A radiographic evaluation (Altus DR, Konica Minolta, model E7252FX) was performed to examine the bone anomalies. The images were processed using a digital detector AeroDR NS 14x17". The radiographic examination confirmed the suspected alteration, revealing bone tissue within the aforementioned joint structures that had developed in an abnormal position, suggestive of metatarsals or phalanges (Fig. 1C & D). These findings indicate a case of phocomelia.

Although morphological anomalies in amphibians are frequently reported worldwide, cases of phocomelia are rare, with scattered records over the decades (Meteyer et al., 2000b; Peltzer et al., 2011; Marushchak & Muravynets, 2018). In Brazil, until September 2024, over 160 cases of

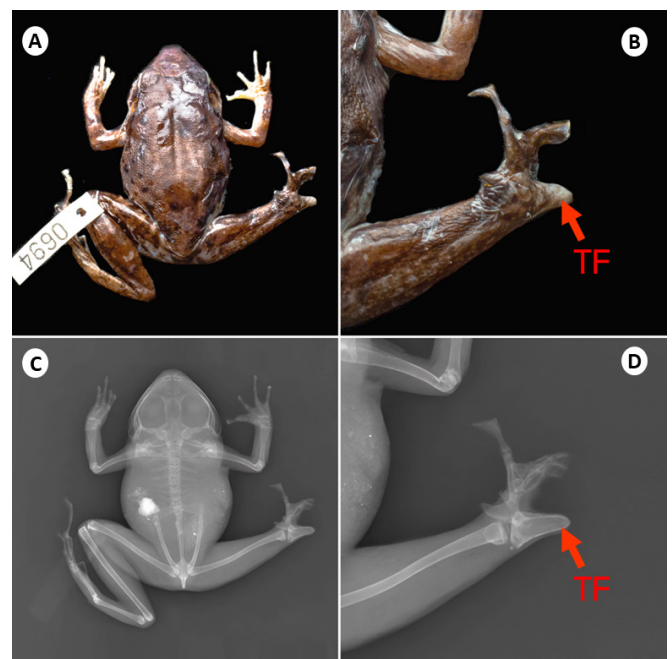


Figure 1. An adult individual of *Thoropa miliaris* showing phocomelia of the right hind-limb - **A.** & **B.** Photographs of the specimen, **C.** & **D.** Radiographs highlighting the classification of the bone anomaly as phocomelia, TF = remains of the tibiofibula

anomalies in anurans had been recorded, but no case of phocomelia had been diagnosed (Baroni et al., 2024). It is important to note that in some cases there might be divergences in the classification of the bone anomaly, due to poor definition when analysed only by an external assessment of the specimen (Meteyer, 2000b), since a complementary evaluation with radiographic examination is necessary for a correct identification.

Although our report concerns a single individual and we did not determine the specific causes of the observed anomaly due to an unknown history, the documentation of phocomelia in *T. miliaris* is significant. It marks the first report of this rare malformation in an endemic species of the Atlantic Forest biodiversity hotspot. This finding emphasises the importance of using complementary diagnostic techniques, such as radiography, to better understand skeletal anomalies.

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