Fundação de Medicina Tropical Dr. Heitor Vieira Dourado

HEPATOZOON PARASITES (APICOMPLEXA: HEPATOZOIDAE) IN VIPERID SNAKES FROM THE BRAZILIAN NORTH AND NORTHEAST

Amanda Maria Picelli1[1], Gabriel Viturino Rios[2,3], Thabata Cavalcante dos Santos[2,4], Fabiane Rocha de Paula[5], Hugo Fernandes Ferreira[6], Claudia María Ríos-Velásquez[7], Felipe Arley Costa Pessoa[7], Rodrigo Castellari Gonzalez[2]

[1]Fundação de Medicina Tropical-Dr. Heitor Vieira Dourado, Manaus, AM, Brazil; [2]Museu de História Natural do Ceará Prof. Dias da Rocha, Pacoti, CE, Brazil; [3]Centro Universitário Fametro, Fortaleza, CE, Brazil; [4]Programa de Pós-graduação em Sistemática, Uso e Conservação da Biodiversidade, Fortaleza, CE, Brazil; [5]Programa de Pós-Graduação em Biodiversidade e Saúde, Instituto Oswaldo Cruz, Rio de Janeiro, RJ, Brazil [6]Universidade Estadual do Ceará, Quixadá, CE, Brazil;[7]Laboratório de ecologia de doenças transmissíveis na Amazônia, Instituto Leônidas e Maria Deane, Manaus, Fiocruz, AM, Brazil.

INTRODUCTION

Hemogregarines from the genus *Hepatozoon* (Apicomplexa: Hepatozoidae) are a common group of intraerythrocytic parasites and especially diverse among host snakes. In Brazil, 40 species of *Hepatozoon* have been found in at least 35 snake species. However, among these snake species, only a few (5 spp.). are venomous of medical importance and most of these reports were from Southeastern Brazil. In this sense, we performed a survey of *Hepatozoon* parasites in snakes from the family Viperidae in the North and Northeast regions of Brazil .

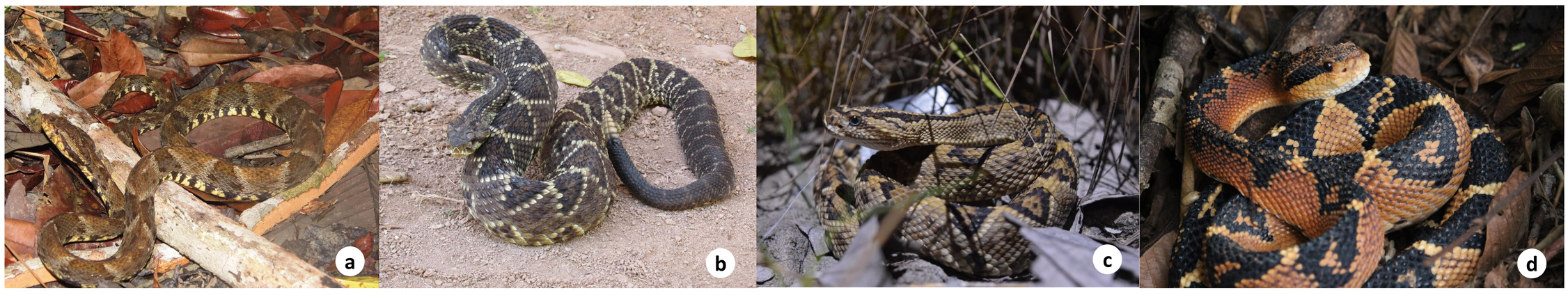

Fig. 1.Viperid snakes sampled in this study: *Bothrops atrox* (**a**), *Crotalus durissus cascavella* (**b**), *Crotalus durissus ruruima* (**c**) and *Lachesis muta* (**d**). Photos: Pedro Bisneto; Rodrigo C. Gonzalez; Anderson Rocha; and Thabata Cavalcante, respectively.

METHODS

Snake samplings were carried out from February to July 2022 in the municipalities of Baturité, Guaramiranga and Pacoti, State of Ceará, municipality of Macapá, State of Amapá, and municipality of Manaus, State of Amazonas. Blood samples were collected for microscopic analysis (Fig. 2). In positive animals, parasitemia was estimated by looking for parasite forms in 20 replicates of 100 erythrocytes (parasites/2,000 cells).

Fig. 2. Blood sampling and processing for microscopic analysis. (**a**) Blood collected by caudal vein puncture; (**b**) blood smears were prepared; (**c**) smears fixed in absolute methanol and stained with Giemsa solution (10%); (**d**) blood smears examined under a microscope at ×400 and ×1,000 magnification.

CONCLUSION

Our research:

- Marks the first time that *Hepatozoon* has been found in snakes from Ceará.
- Is the first to show *Hepatozoon* infection in *B. atrox* and *L. muta*, two critically important species for medicine whose hemoparasites are poorly understood.
- Indicates that the viperid snakes may harbor a wide variety of *Hepatozoon* parasites.

RESULTS

A total of 21 viperid snakes were captured and *Hepatozoon* parasites were found in 62% (n = 13/21) of these hosts (Fig. 3). The positive individuals were *B. atrox* (Amapá; n = 1/1), *C. durissus cascavella* (Ceará; n = 8/9) and *L. muta* (Ceará; n = 3/3). All animals sampled in Manaus were negative, *B. atrox* (n = 7) and *C. durissus ruruima* (n = 1). The mean parasitemias were: 1.4% (n = 28/2000) in *B. atrox;* 7.35% (n = 147/2000) in *C. durissus cascavella;* and 10.4% (n = 214.3/2000) in *L. muta*.

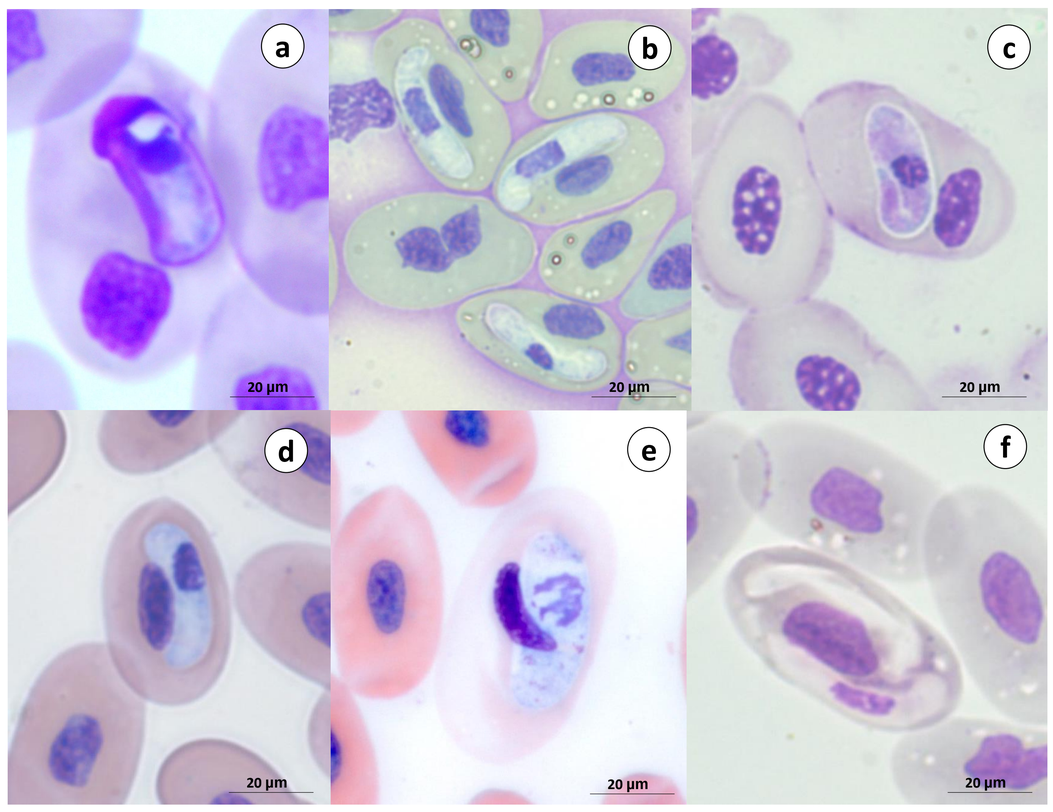

Fig. 3. *Hepatozoon* spp. infecting viperid snakes from North and Northeast regions of Brazil. Gamonts foun in *B. atrox* (**a**), *C. durissus cascavella* (**b-e**) and *L. muta* (**f**).

REFERENCES

Paula FR, et al (2022) A 50-yearold redescription: molecular and morphometric characterization of *Hepatozoon carinicauda* Pessôa and Cavalheiro, 1969 in the brown-banded water snake *Helicops angulatus* (Linnaeus, 1758). Parasitology 1–11.

Telford SR Jr (2009) Hemoparasites of the Reptilia: Color Atlas and Text. Boca Raton: CRC Press.

amanda.mpicelli@gmail.com